CANADIAN THESES ON MICROFICHE

21919

THÈSES CANADIENNES SUR MICROFICHE

AUTHOR/AUTEUR

NIELSEN, A.B.

TITLE/TITRE

PHYSICAL ACTIVITY PATTERNS OF SENIOR CITIZENS.

21919

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CANADIAN THESES ON MICROFICHE / THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/*NOM DE L'AUTEUR* Arne Brian Nielsen

TITLE OF THESIS/*TITRE DE LA THÈSE* Physical Activity Patterns of Senior Citizens.

UNIVERSITY/*UNIVERSITÉ* University of Alberta

DEGREE FOR WHICH THESIS WAS PRESENTED/ *GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* Master of Arts

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE DEGRÉ* 1974

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THE UNIVERSITY OF ALBERTA

PHYSICAL ACTIVITY PATTERNS OF SENIOR CITIZENS

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

DEPARTMENT OF PHYSICAL EDUCATION

EDMONTON, ALBERTA

FALL, 1974

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Physical Activity Patterns of Senior Citizens" submitted by Arne Brian Nielsen in partial fulfilment of the requirements for the degree of Master of Arts.

Ruby D. Anderson
.....
Supervisor

.....

.....

Date May 23/74

DEDICATION

I would like to dedicate this final manuscript to my wife, Kathy, who through her patience, assistance, and love, made it possible to continue the project through to completion.

ABSTRACT

The basic purpose of this study was to gather and provide information regarding the physical activity patterns and preferences of senior citizens. It was also intended that this study investigate the past physical activity patterns, including occupational demands, and their relationships to senior physical activity patterns.

Data were collected by interviews in conjunction with response-choice lists. A checklist provided information about individual activities participated in during youth, middle age, and the senior years. An introductory letter was sent to each person in the original random sample of 199 members of senior citizens centers. Out of the original sample number, 151 people consented to be interviewed by the investigator. Therefore the final sample consisted of 151 members of senior citizens centers in Edmonton, Alberta, Canada.

Data analysis consisted of percentage tables based on response distributions of closed-ended questions and rank order lists of past and present physical activities. Variety indexes were calculated based on the number of physical activities engaged in during youth, middle age, and the senior years. Senior physical activity participation index was constructed by determining the frequency of activity participation of the subjects within the last year prior to the study. The physical nature of the respondents' primary occupation type was assessed by the investigator on the basis of information provided during the interview.

Chi square analyses were used to determine the extent of inter-relation between senior physical activity level and various factors including occupation type, past physical activity variety levels, and respondents' self assessed past activity levels. The relationship

between youth and middle age activity variety levels was also investigated as was that between past physical activity variety and sex of respondents.

The results indicated that although domestic and everyday physical activity held constant from youth to old age, there was a general shift from strenuous and vigorous sports activities during youth to less vigorous "life-time" types of activities during the senior years. There was an overall decrease in the physical activity variety from youth to the senior years but there was a significant relationship between middle age physical activity variety level and senior variety and physical activity participation levels. It appeared that a wide range of activity experiences during youth led to a wide variety during middle age which, in turn, was related to the physical activity variety and extent of participation of senior citizens.

Occupation type was not significantly related to senior physical activity level and neither were primary activity location, attitude of activity inportance, concept of ideal activity time per week, age, sex, or past self assessed activity levels.

The primary reasons for taking part in physical activity during the senior years were, (1) concern for health, (2) to relieve tension, (3) to get exercise, and (4) for the pleasure of feeling good. Learning new skills was the least important reason listed. Transportation problems and poor health were the primary obstacles which prevented senior citizens from getting more physical activity of their choice.

Preference was quite equally divided between organized, regular programs at activity centers (including sports facilities) and a desire to engage in activity on a very individual and informal basis. The present situation showed most people engaged in physical activity

primarily when alone and at home or during everyday activities. The sample thought physical activity was very important to their health and felt that eight or more hours per week should be a minimum. Generally, the majority of the sample was satisfied with the amount of physical activity presently engaged in while one third of the sample said they needed more.

Generally it was apparent that senior citizens had a positive attitude toward physical activity but were less enthusiastic about formally structured activity programs. It also appeared that the variety of past physical activity experiences, especially during middle age, was related to the physical activity level during the senior years. Occupation was not significantly related to senior physical activity level.

Additional research is needed to investigate further the physical activity habits, preferences, and capabilities of senior citizens.

ACKNOWLEDGMENTS

The author wishes to thank the members of his Committee, Professor R. O. Anderson, Committee Chairman, Faculty of Physical Education, Dr. P. L. Austin, Faculty of Physical Education, and Professor L. J. Fournier, Department of Recreation Administration for their patient guidance and assistance throughout this project.

The author would also like to thank Professor M. A. Hall for her assistance in acquainting the author with appropriate computing techniques for data analysis. Appreciation is also expressed to the administrations and members of the senior citizens' centers who were kind enough to help by advising or responding to the survey. The author is also grateful to Mrs. Linda Pedersen for her work in the typing of the thesis.

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CHAPTER I

THE PROBLEM

Introduction

There is no doubt that in the past the primary focus of physical education and activity programs has been on the youth of Canada. This has been done through the community programs as well as in the school systems and has resulted in ample opportunity for most young people to take part in organized physical activity programs.

There is another increasingly large segment of our population that does not have comparable opportunities for participation in physical activity programs. This segment consists of people over sixty years of age, defined in this study as senior citizens.

There is no doubt that the physical activity level of an individual usually decreases as age increases (74). Reasons for this vary from one person to another depending on a number of variables. A lack of free time during the employment years may be one factor while a general physiological decline is probably another.

Senior citizens are at the finale of this physical activity decline and are therefore the least physically active segment of the Canadian population (74). In addition to general physiological decline with age there are other suggested factors (26) that seem to hinder the participation in physical activity programs. Among these are transportation problems, economic difficulties and lack of available programs. Transportation factors include expense, inconvenience of routing and scheduling, weather conditions, and crowd problems. The lower income of senior citizens relative to the general population (16) often prohibits

the regular participation in such activities as require dues or fees. Although the actual income of the elderly varies it is usually a significant decrease from their previous employed income (61). Even with special rates the cost of some activities may be prohibitive to many senior citizens.

Although the above factors are considered to be the major reasons for low physical activity participation by senior citizens it has not been documented that such is the case.

Physical activity is known to be of benefit to the health of elderly people as well as adults and young people (6, 32, 36). Since a significant proportion of Canadian society is in the over-sixty age bracket, it seems important that these people are afforded the opportunity and guidance which may lead to their participation in meaningful physical activity programs designed with senior citizens' needs in mind. It is assumed in this study that participation in physical activity by senior citizens results in meaningful rewards, physical and/or psychological, for those participating.

Designing programs for any group of people has, as a prerequisite, the need to determine what the desires and requirements of these people are. Likewise, to determine the characteristics of valuable physical activity programs for senior citizens first requires that the senior citizens themselves be understood in terms of their needs and demands. To develop the most effective type of program also may require some understanding as to why the physical activity habits of senior citizens are such as they are. Hopefully this investigation will provide information that can be used to provide more effective programs in the future.

Statement of the Problem

The purpose of this study was to gather and provide information related to the past and present physical activity habits of senior citizens who are members of selected senior citizens centers in Edmonton, Alberta, Canada.

Specific problems were as follows:

1. To determine and describe present physical activity patterns of senior citizens.
2. To determine the relationships between past and present physical activity patterns of senior citizens.
3. To discover the preferences of senior citizens with regard to content and organization of physical activity programs.
4. To investigate the relationships between the physical nature of past primary occupation type and the physical activity patterns of senior citizens after retirement.

Hypothesis

The following hypotheses will be tested:

1. The extent of present physical activity of senior citizens is a function of past physical activity habits.
2. The extent of present physical activity of senior citizens is a function of the physical nature of the primary occupation during the working lives of these senior citizens.

Need for the Study

Based on present industrial nation trends the proportion of senior citizens is increasing in relation to the general population (61).

Therefore a significant, increasingly large portion of the Canadian population is elderly. According to Statistics Canada (74), in 1971 Canada had two and one half million people who were over sixty years of age. This total was almost twelve percent of the Canadian population. In Alberta, at the same time, there were over one hundred and seventy thousand, or nine percent, of Edmonton's 1971 population was over sixty.

With the passage of time the proportion of senior citizens in this country will likely increase. Improved medical programs enable people to acquire medical services with greater ease than in the past. The medical services themselves have improved and continue to do so with medical research. The net result is that more people survive formerly fatal diseases and incidents and eventually the senior citizen population increases.

The ratio of senior citizens to the under-sixty age group will increase partially because of the decreasing birth rates in most of Canada. There will simply be less replacements for the younger age categories.

The need for research in the area of leisure for senior citizens has been emphasized by Kaplan (48). He has pointed out that other areas of gerontology, such as problems of health, income, and housing, have been studied far more extensively than leisure patterns and opportunities. Considering the large amount of "free time" available to senior citizens today it would seem crucial that useful information be accumulated regarding the meaningful use of this "free time". Physical activity may well be an important contribution towards fulfilling senior citizens' leisure needs.

The physiological and psychological benefits of exercise in the

form of suitable physical activity are generally accepted for all age groups including senior citizens. Although the research varies as to the actual effects of physical activity on the aged, there is general agreement that there is an overall benefit.

There is, however, a gradual physiological decline during the aging process which limits the extent and nature of physical activity suitable for elderly men and women. Programs for the senior citizens are therefore limited as to variety and extent. This is especially true in cities such as Edmonton where the climatic conditions during the winter are a very real limiting factor for regular physical activity.

To develop programs that are of the greatest benefit to senior citizens first requires the collection of information about the population to be served. This study was an attempt to gather and analyze that information. It is hoped that with the pertinent information, physical activity programs can and will be initiated, maintained, and supported by the concerned organizations.

This study attempted to examine the relationships between present physical activity habits and past influential factors, such as physical activity habits and occupation type. To understand not only the existing physical activity patterns of the elderly but also the reasons behind the formation of these patterns may have implications for future generations of senior citizens.

It is an assumption of the investigator that regular physical activity, as administered through programs, does make life for senior citizens more rewarding physically and psychologically.

Limitations of the Study

This study was limited in the following ways:

1. The validity of the responses to the questionnaire was dependent upon the ability of the respondents to recall the extent of their physical activity participation within the last year and, in a more general context, the extent of their physical activity in their past.

2. The questionnaire was of a closed nature in that choices were provided to the respondent and a selection was made. Although the list of responses was assumed to include all possible relevant responses this may not have been the case, causing some possible responses to be overlooked.

3. The interviews were carried out, in total, by the investigator and with the respondents' knowledge that the investigator was in the field of Physical Education. This knowledge may have tended to bias the responses of the sample to the questions regarding physical activity.

4. The survey was dependent on the reliability of the proportionate, systematic random sampling procedure in which a given proportion of members was selected, at regular intervals, from the membership files of selected senior citizens centers in Edmonton.

Delimitations

This study was delimited:

1. To a randomly selected sample of 199 people who were members of three selected senior citizen centers located in the city of Edmonton, as of November 20, 1973.

2. To a questionnaire comprised of only those questions which were felt, by the investigator to be of the utmost relevance to the

investigation of physical activity patterns of the sampled senior citizens.

3. To participation measured by frequency of involvement rather than by calculation of actual time spent in physical activity.

Definition of Terms

Middle Age. The period of life from thirty years of age to fifty-nine years of age, inclusive.

Physical Activity Participation Index. The frame of reference based on frequency of participation in physical activity within the last year. The following indicate, for the purposes of this study, the various relative levels of the participation index: (1) inactive, (2) slightly active, (3) average, (4) quite active, (5) extremely active. Each of the preceding levels was composed of approximately twenty percent of the total interviewed sample.

Physical Activity. Activities which involve gross human movement and/or include, as a major component, the execution of a physical skill. A competitive element may or may not be present.

Physical Activity Program. Those organized systems which have, as a major objective, the inclusion of physical activity by the participants either in groups or individually.

Physical Performance. The effectiveness with which a physical activity is executed.

Senior Citizen. A person who is sixty or more years of age.

Senior Citizen Center. An organization which requires that its members be senior citizens and which offers some services to its members other than accomodation.

Variety Index. The frame of reference based on the participation in a number of different physical activities. The following indicate, for the purposes of this study, the levels of relative variety, index classifications: (1) low variety, (2) middle variety, (3) high variety. The variety index was applied to all three age groupings dealt with in this study, namely: youth, middle age, and senior citizen.

Youth. The period of life from birth to twenty-nine years of age, inclusive.

CHAPTER II

REVIEW OF LITERATURE

Some aspects of physical activity of senior citizens have been widely researched while others have been largely ignored. Research on aging has heretofore been focussed primarily on the physiological and psychological effects of the aging process. There has also been investigation into the physiological effects of physical activity of elderly people. Very few studies have been done on the psychological effects of physical activity or the physical activity patterns of the aged.

The review of literature attempts to deal with the major related aspects of physical activity of the elderly. First a general discussion of the physiological changes that occur with aging is presented. Secondly, a review of studies pertaining to the physiological effects of physical activity on old people is presented. There have been a number of investigations in this area and it was felt by the investigator that the effects of physical activity on senior citizens must be established before meaningful study in the area of physical activity of senior citizens could be carried out.

The third section of the literature review discusses the psychological changes that take place with aging. These, like the physiological changes, are important factors which must be considered when discussing the aged. Following this section is a presentation of observations concerning the effect of physical activity on the psychology of aged people. Due to the lack of study in this area, many of the observations are from the comments of investigators whose concern was actually in another area of research with the elderly.

The fifth, and last, section of the review of literature deals with the physical activity patterns of senior citizens. Since there is essentially no literature in this area much of the information presented actually refers to middle age and later adulthood. The relationships of physical activity to occupation, age, socioeconomic status and other factors are outlined as much as the very limited research would allow.

Physiological Aspects of Aging

There is a great deal of difficulty separating "normal" aging from "abnormal" aging. Some of the features which are considered typical of aging may in fact be typical of some common disease. As Cohn (24) points out a physiological change that is usual in not necessarily natural or normal. Certain diseases in some cultures are typical and usual but it is still argued that disease by definition is abnormal.

When discussing cardiovascular changes with age the normal-abnormal conflict is at its height. Skinner (70) mentions that the effects of aging and of cardiovascular disease on the circulatory system are so similar that many of the so-called "aging" effects may be due to disease. Regardless of this, there are significant changes in the structure and function of the cardiovascular system that are quite characteristic of physiological decline with aging.

The arteries are subject to a decrease in the elasticity of the walls (4, 1) accompanied by an increase in the collagenous tissue in these vessels. The reactivity of small vessels to hormones decreases (1) and the arterial system as a unit becomes less adaptable.

The venous system is subject to similar effects, i.e. increased thickness, calcification and decreased functional elasticity (1). The

heart itself is subject to collagen deposit (6) and a decrease in the size of the muscle fibers has been detected (4).

These changes in the cardiovascular system produce functional changes as well. While heart weight increases it appears that the increase is not functional muscle (6). Indeed, resting heart rate and pulse are quite similar to that of young men. Maximal heart rate, cardiac output, and stroke volume are significantly lower for aged persons (6). Granath et al (43) used right heart cathertization with 17 aged men from 61 to 83 years of age to estimate cardiovascular pressures and cardiac output at rest and during exercise. This data was compared to that of young men. The resistance indices for pulmonary and systematic circulation were higher for the elderly men. The mean cardiac output was lower for the elderly men but the increase of blood flow to working muscles was proportionately the same. Stroke volume was consistently lower for the old men and was thought to be the major factor in cardiac output differences.

Brunner and Meshulam (17) examined and tested 45 men who were members of health clubs. Workloads were carried out on a bicycle ergometer with constant ECG monitering. The subjects were divided into three groups on the basis of age. The youngest group was 55 to 59 years old. The middle group was 60 to 64 and the oldest group 65 to 71. The workload was started at 300 kg/min. for 6 minutes. Following a four minute rest the workload was increased by 150 kg/min. and was carried on for 6 minutes. Again a four minute rest, a 150 kg/min. increase and a 6 minute work period. With any abnormal ECG or pulse indications the testing was stopped. Depending on the amount of work done the subjects were classified into high, middle, or low workloads.

Results showed that 11 of the men were quite fit compared to average for their age. Those performing the high workload had an average age of 61.6 years. The middle and low groups were average ages of 64.7 and 66.1 years respectively. There was then a decline of working ability with age even though all subjects were relatively fit.

So it appears that the adaptability of the cardiovascular system to stress declines with age. The extent to which this decline occurs is partially related to habitual physical activity but there seems always to be a decline even in active persons (70).

Aging of the respiratory system is also an important factor when considering physical performance changes. There is a decline in respiratory efficiency in most people from early adulthood on. In old age there is decreased elasticity of the lungs and inefficient emptying of air (69). The thorax becomes less flexible as calcification of costal cartilage "cements" the rib cage and prevents the mobile action which assists breathing (52, 69).

Functional changes in the respiratory system include a decrease in vital capacity (6, 52), maximal oxygen uptake, forced expiratory volume, and maximal pulmonary ventilation and respiratory frequency (6). Actually the respiratory abilities of the aged are usually enough to meet the general needs that arise in day to day life. The primary decline is found in the adaptability of the respiratory system to exercise or stress. Neural functioning and integration are important aspects of all movement. A decline in neural efficiency must result in a decline in quality of movement.

Sinclair (69) states that the first manifestations of aging are found in the nervous system because of the irreplaceability of damaged

or destroyed nerve cells. He says the results of nerve system degeneration include loss of upright posture, decreased thermal regulation, longer reaction times, loss of gross coordination and reduction of visual and auditory acuity and range.

Likewise, Andrew (4, 218) states:

> The nervous system has a position of special importance in relation to considerations of the aging process because of two factors: (1) changes in this communicating and governing system will affect many organs in other systems and lead to disturbance of precisely balanced functions, and (2) the neurons, units of the nervous system, differ from the majority of types of cells in that in postnatal life they generally do not reproduce, and thus as individual cells or groups of cells, they are not replaced if they degenerate or die before the death of the organism.

Andrew also mentions atrophy of the brain of the aged characterized by a loss of weight and decreased numbers of cells.

Using cranking ability as a measure of neuromuscular coordination with subjects 20 to 89 years of age Shock and Norris (62) found that cranking ability declined consistently from ages 39 and older. Cardiorespiratory and strength factors were controlled for and did not enter into the performance to any great extent. Shock and Norris concluded that reduced coordination ability is the primary cause for a deficit of power output in older people.

Fait (36) mentions a decrease in speed and coordination as well as decreased acuity of sense organs, particularly visual and auditory.

Brinley (12) points out that older people are slower in performing tasks as well as being more error-prone. Welford (79) agrees that old people are slower in movement but says that this is not due so much to time needed for movement as to more time needed to initiate, guide, and monitor them, due to limiting capacity of central processes. He also states that the aged trade speed off for accuracy when they have a choice.

Visual degeneration was also supported by Friedenwald (38) as an age related change. It seems obvious that a decline in visual ability would lead to a decline in motor performance. Without visual feedback it is very difficult for anyone to perform well on motor skills. Judgement depends largely on perceptual information so a deficit in perception will impair the speed and accuracy of judgement.

The endocrine system of the human being does not escape the effects of aging. There is an increase in connective tissue in the thyroid as well as a marked drop in mitotic activity (4). The adrenal gland shows an increased meshwork of connective tissue and increased pigmentation (20) and general atrophy of the pituitary gland and pineal gland takes place during the aging process. Hormone secretion and ultimate endocrine control decreases with age from adulthood on.

Evidence of aging in the smooth muscle (39) shows an increase in the collagenous connective tissue of the gastro-intestinal tract. The mucosal lining of the stomach becomes thinner (4) and there is a decrease in stomach enzyme and salivary secretions. Sinclair (69) states that the loss of elasticity of the stomach results in dissatisfaction for those old people who retain a good appetite.

The musculature of the body is the only voluntary means by which man can move. There is a general decline in strength of the various muscular systems beginning in the twenties (35). In males part of the strength loss is due to decreased androgen production but it appears that the deposition of collagen (35) and elastic fibers in the muscle is also a contributing factor. This material is not functional and tends to reduce the power of the muscle. Todd (75) stated that muscular power seems to peak at about thirty but that the actual bulk of muscle

often increases until around fifty years of age. Regardless, the aged individual usually is not as strong as he has been at anytime in his life except childhood. The power of sustained effort dwindles in a similar pattern to that of maximal power. Astrand notes a decrease of about twenty percent from age 25 to age 65 (6). These decreases in the functional capacity of the musculature system will of course limit motor performance, especially in areas that require strength or muscular endurance. Certainly the habitual activity of a person is a factor which affects strength decline. Activities which regularly put demands on the muscles will slow the degeneration and atrophy of those muscles.

The effects of aging on the skeletal system vary in accordance to other factors such as nutrition and endocrine functioning. Generally, however, the bones become less resilient, more brittle, more porous and increasingly fragile (4, 68, 69). The bones break more easily and repair more slowly. Hence the seriousness of bone damage in elderly people. Cartilage also calcifies (4, 69) significantly with advancing age and leads to a decreased elasticity of the body.

Other age changes not specifically discussed here occur in the reproductive system, the urinary system, the connective tissue and the skin and fascia.

The sum effects of these changes are that the physiological capacity of the human body declines so that elderly people have, in fact, "less to work with". This is especially true with reference to motor skills and movement performance. It would be incorrect to assume that the aged are incapable of high performance of a physical nature. Generally, however, old people cannot attain physical performance levels equal to those which they attained when younger. Relative to other

people, young or old, their performance may still be excellent but compared to their own past performances a decline will likely be evident with the aging process.

Naturally because of individual differences the rate of physiological decline varies from one person to another. In fact, as people get older the range of differences between individuals increases (79).

Physiological Effects of Exercise for the Aged

There has been a substantial amount of research completed on the trainability of elderly people. For this reason the research reviewed here consists only of human studies and neglects the substantial research done with rats and other animals.

Brunner and Meshulam (17) found that the forty-five older men they studied were quite fit relative to others of their age (55 to 71 years old). Their subjects were all non-smoking members of health clubs and participated regularly in calesthenics and physical activities.

Elderly men, age 70 to 81, were studied by Benestad (9). Thirteen subjects were exercised on a treadmill for six weeks, three times a week. The results showed a favourable training effect including a decrease in working heart rate, a rise in blood volume and hemoglobin and an improved work efficiency. The ventilation efficiency was not significantly altered.

Dill et al (34) performed one of the few extensive longitudinal studies when they investigated the physiological parameters of sixteen long distance runners. Each champion runner was studied at various intervals for at least twenty years after competition was terminated. It was found that while a decline did occur it was less than for

"normal" people over the same period. Part of the reason for this maintenance of fitness was undoubtedly genetic endowment but it is probably significant that most of these men still made a conscious effort to get regular physical activity and exercise.

Twelve old men (average age: 69.2 years) of average physical fitness were compared to eleven young men (average age: 16.8 years) by deVries and Adams (33) on the basis of ventilatory mechanics. The young men were more efficient in terms of ventilation than the old men but the old men were still above average. A bicycle ergometer was used to control the work being done.

Saltin and Grimby (62) investigated the fitness of 29 former athletes who had been sedentary for at least 10 years prior to the study. The data was compared to athletes who were still active in late middle age and senior years. Due to the nature of sample selection it was assumed that the differences between the still active group and the former athletes were caused, to the main extent, by the difference in physical activity during the last one or two decades prior to the study. Almost all the former athletes were superior to non-athletes in aerobic power. Yet the former athletes were still significantly inferior to still-active athletes in terms of aerobic power. It appears therefore that physical training on a regular basis can substantially decrease the decline in aerobic power.

Barry et al (7) used eight subjects (five men and three women) who had an average age of 70 years to determine the training effects, if any, related to work capacity, respiratory function, and work electrocardiogram. There were five control subjects with an average age of 72 years. The exercise subjects trained for three months for rhythmic

endurance on a stationary bicycle ergometer. When retested at the initial workload a significant reduction in circulatory stress was evident. Retesting at the workload limit, which was 76 percent higher than pretraining limit, was accompanied by increased range of functional responses in oxygen uptake, pulmonary ventilation, systolic blood pressure, and blood lactate level. These changes were interpreted as an improvement in functional status.

In a follow-up study Barry et al (8) used the same subjects and the same training program to observe changes in motor performance on agility, endurance, imaging, hand movement speed and a simple vision discrimination task. The training was accompanied by improvements in muscular endurance, agility, hand movement speed, the visual discrimination task and imaging. Balance, flexibility, cognition, personality and motivation did not appear to change. These results may suggest that physical conditioning is associated with the adaptation of a neural regulatory mechanism to a higher level of functioning. Control subjects did not change on any of the items.

Skinner (70) agrees that old people experience a training effect with exercise but says that people can expect less improvement if they start training in late life. This is not contradictory when the overall physiological potential decline is taken into account. It may well be that a dramatic training effect is not necessary for the person to experience the practical benefits of physical activity in later life. Bortz (11) seems to confirm this when he states that the maximal physical capacities of older people are not extremely relevant since they do not live on maximal-challenging basis. Bortz believes that besides the general physiological benefits of fitness of the elderly, there are

many other fulfilling aspects with regard to achievement, tension, and psychological factors.

In one of the few studies involving women, Adams and deVries (2) had 17 subjects, aged 52 to 79, participate in a vigorous three month exercise program. They worked out three times a week, one hour at a time. There were six controls drawn from the same population. The trainability of older women was established in that physical work capacity and resting heart rate were significantly improved. The improvements were in fact about the same magnitude as those that are commonly reported in young people. There were no significant changes in skinfold measures, blood pressure, oxygen consumption or ventilatory measures. Maximal oxygen consumption did increase greatly (thirty-seven percent).

A similar investigation was done by deVries (32) with 112 men aged 52 to 87. The length of the training program varied from six to forty-two weeks. The conclusion was that the trainability of old men with respect to physical work capacity is probably greater than is generally assumed. There seemed to be no relationship between training effect and past physical training history. Muscular function improvement at this age probably occurs because of nervous system activation improvement and is not due to muscle hypertrophy.

Since there are many aged persons who live in institutions of one type or another it is important to find out how they react to exercise. If they do not react similarly to those not institutionalized the question arises as to how activity programs for them should differ.

Stamford (71), in the first of two studies, selected 17 patients from the ambulatory ward of a hospital to participate in his physical

exercise program. An exercise and a non-exercise group were established. The exercise group worked out daily, Monday through Friday, on a treadmill for 12 weeks. The length of each workout was gradually increased from six to twenty minutes. These geriatric patients were pre- and post-tested on the treadmill and bicycle ergometer. Although a low level training load was used there were significant changes in the heart rate and blood pressure. It is interesting to note that the training effect did not take place until the later weeks of training.

The subjects (geriatric ambulatory patients) used in another study by Stamford (72) were similar except that the patients were classified as chronically institutionalized, recently hospitalized, or control subjects, based on the number of years of continuous institutionalization. The first group had been institutionalized a minimum of 20 years, the second group had been admitted less than one year prior to the study and the control group were selected without regard to years of institution residence. Exercise was carried out daily for five days a week for a total of 18 weeks. Pretraining testing showed a lower fitness level of the chronically institutionalized group as compared to those recently admitted. After 6 weeks of training the chronically institutionalized group showed a significant training effect. This training effect slowed down during the second 6 weeks. The recently admitted group showed no training effect for the first 12 weeks. The training intensity was increased during the last 6 weeks and both groups had significant improvements in physical fitness. The control group, as expected, showed no improvement in fitness. It was concluded that excessively restricted physical activity characteristic of chronically institutionalized patients seems to contribute to a reduced fitness level with age and the ability

to respond to a minimal level training stimulus. It also supported the idea that the aged are trainable regardless of previous exposure to physical activity.

Thus far most of the work discussed has dealt with physiological aspects of work capacity, respiratory functions and general functional parameters. One of the common complaints of older people involves stiffness of, or lack of flexibility in, the joints. Chapman and deVries (22) studied exercise and age-related stiffness. A group of boys (15 to 19 years) and a group of men (63 to 88 years) served as subjects for the study. An index finger movement was used because of the isolateable characteristics of the joint movement. A six week exercise program for the finger was carried out by both groups. The contralateral finger was used as an unexercised control At the end of the training program both groups, young and old, showed significant improvements in flexibility and strength. However, as with pretraining flexibility, the young group still had less stiffness than the old group. So while older people cannot improve their joint mobility to the same extent as young people, there is nevertheless a training effect with physical activity.

Gore (40, 41, 42) did a three part, fairly extensive, review of Soviet literature on physical activity and aging. Although much of the data confirms what has been done in western literature a few of the general points will be mentioned here. Gore mentions the philosophy of the "Soviet workers" in the field (41:66).

> More recently, however, Soviet workers have been considering physical activity as a means of modifying the overall process of aging through the fundamental relationship of the motor, visceral and metabolic systems. Their guiding principle is that input of appropriate stimuli is an essential requirement for the maintenance of the smooth physiological functioning of the organism as a whole. A deficiency of stimuli leads

> eventually to malfunction and atrophy. Physical activity is regarded as the natural, physiological means of providing such stimuli, which, can be regulated at will.

Physiological research by the Soviet seems to tend towards long-term longitudinal studies with aged subjects. This type of work is, of course, the most reliable and valid when researching the changes that occur with aging. General physiological findings show that exercise tends to normalize the blood picture in elderly subjects, produce a significantly improved shift in motor function, improve the functional capacity of the organism in the cardiovascular system. While respiratory functions seemed to benefit from systematic physical activity of the elderly, the evidence was not as strong as with the aforementioned parameters.

Gore (42) in the third part of his review looks at the nature and character of physical activity as recommended by the Soviet researchers. Again Gore (42:78) discusses the philosophy of Soviet researchers regarding the content of exercise programs for the aged.

> Soviet workers consider that the most effective design of exercise programmers for the elderly must be based on the principle of providing training for the most adversely-affected functions (motor, circulatory, respiratory). Such training, progressing gradually under careful supervision, effectively combats deterioration by strengthening the "weak links" in the organism.

The research reviewed seems to indicate that initial exercises should be endurance oriented with low-intensity loads. Avoidance of abrupt movements, jumping, running, or marked static tension is recommended initially. As training increases these aspects may be introduced at the proper time. Within the limits of their functional capacity, old people should perform relatively intense strength-developing and brief speed-increasing tasks. Frequent changeover of activities is

recommended so that the organism must adapt to various situations and improve as a whole. Complex sessions which include cycling, tennis, basketball and even gymnastics have been effective as well as swimming, volleyball, and badminton sessions. All activities are carefully graded. Walking is emphasized as an excellent exercise for the elderly. The pace and duration can be progressively increased. A ten year study showed that even two one and one half hour sessions per week improved coordination as well as performance on various other tasks.

Gore (42:83) summarizes the overall implications of the Russian work.

> Basically Soviet workers do not accept these manifestations as necessarily reflecting irreversible deleterious changes. Their approach is that the potential of the organism should be realized as far as possible. The results of training do seem to show that even in advanced age the potential ability of the organism to function better and to adapt remains, provided it is suitably challenged and trained to respond. It thus seems possible to delay the onset of aging through exercise .....

Again this brings up the controversy as to what is "normal" aging and what changes (usually decline) are due to decades of inactivity and unhealthy life styles. While the research varies according to what the training effect of exercise is with old people there is no doubt that there are fitness-related changes which are beneficial to the individual's health. Physiologically speaking, physical activity may or may not affect the rate of aging, although many researchers believe it does decrease the rate. A fact that is undeniable is that people who are physically active in old age have a performance capacity that is superior to inactive people of the same general age. There is also little doubt that even if an individual has an inactive past, sensible training improves his functional capacity in a physiological sense.

Gore (42:84) points out the situation well:

> It is somewhat ironical that when an elderly person is ill, measures are taken to restore or rehabilitate his or her functions. Surgical procedures are undertaken, physiotherapy and rehabilitation after a stroke, etc. There is faith in the potential of the organism to respond, and it very frequently does respond. This faith and this approach need to be extended to the fit-but aging-organism. The attitude that 'one is not getting any younger' produces resignation and discourages rational ways of preventing disabilities. This our society can ill-afford, since the numbers of elderly people are rising and every effort should be made to keep them as fit and as independent as possible - even if the span of life cannot be significantly extended.

Psychological Aspects of Aging

It is, at best, risky to discuss psychological factors in general terms. As has been mentioned, physiological changes occur in aging which, while fairly general to a given population, are still very individual in nature. The actual changes vary as well as the rate that these changes take place. The differences between people become greater as those people become older.

The same is true regarding psychological aspects of aging, only to a greater extent. Due to the innumerable factors that contribute to an individual's personality there are innumerable different types of personalities. This is true at any age including the elderly. It is therefore very important that each individual be treated as such. However, it may be helpful in certain situations to use generalizations, keeping in mind that it is very unlikely that any one individual will fit the "general" pattern exactly. It does however, provide a framework from which to begin when working with, or studying elderly people.

As Miles (53) pointed out, the aged have often been viewed as being on the low end of the physiological scale and the high end of the "wisdom" scale. Likely both measures are exaggerated. He says that

physiological decline in older years can often be compensated for by an organized effort in psychological methods. There is no critical line at which the psychological production ceases. It is the personality that sets the final limits.

Neugarten (57) stated that aging increases the pre-occupation with the inner life. There is a constriction in the ability to integrate wide ranges of stimuli and a decrease in the willingness to deal with complicated and challenging situations. She also mentioned that there seems to be a reduction in personality complexity. This takes place over long periods of time by habituating responses to the environment and adjusting these responses as is necessary.

Among the personality and mental changes in aging mentioned by Fait (36) are a decrease in short term memory, conservatism, loss of confidence in learning ability and maximal use of experience to make decisions.

Welford (78) mentioned a decrease in the adaptability of older people as a major factor affecting performance. He also asserted that this decrease is not incompatible with achievement especially if the adaptation is facilitated as much as possible. It would also appear that the amount of information that can be held in short-term memory decreases in old age. This limitation applies more to complex situations than to simple ones. A study by Canestrari (19) showed the same results.

Schaie and Strother's (63) work with intellectually superior adults showed that, even in an advantaged environment, a psychological decrement occurs, especially in visual-motor tasks.

Birren et al (10) compared 30 young subjects (aged 18 to 30) and 23 old subjects (aged 60 to 80) on performance speed, varying the nature of the stimulus and response associations. The conclusions stated that

the slower response speeds in the old group were not due solely to the motor aspects of the task. It was thought that psychological associative processes were the major factor for the differences.

Bromley (13) found that there was an age-related decrease in the abilities to psychologically abstract and generalize. This supported the hypothesis that aging somehow affects the conceptual thought processes. Similarly Szafran (75), when studying aircraft pilots, found that the older group was slower with regard to high speed decision making processes, especially those requiring short-term retention.

The role of experience in response speed was studied by Murrell and Griew (56). They concluded that experience gained in time through work can, many times, fully compensate for decreases in biological capacity with age.

Again the danger of generalization should be stressed when discussing old people. To a certain extent at least the assertion by Heron and Chown (46) that aging is not a "unitary" process must be upheld. Physiological decline often occurs completely independent of psychological decline. Conversely the mental aspects can decrease in funtion while the physical condition remains relatively stable. Research has established no given age or even decade of life in which psychological changes are likely to occur. While every sixty or seventy year old is likely to be physiologically inferior to his younger years the same is not true for psychological functions. So while there seems to be an overall decrease in accuracy, speed, and complexity of psychological processes this does not necessarily mean a drastic, or even significant, reduction in effectiveness of average task performance in older people. Experience and other factors such as strategy may help compensate for other physiological or psychological declines in capacity.

Psychological Effects of Physical Activity for the Aged

Much research into physical activity and aging does not concern itself with the psychological effects of physical activity participation. In fact there is a definite lack of studies dealing strictly with this topic. However those which do exist in addition to the comments from other investigators can offer some information in the area.

Kreitler and Kreitler (50) stated that regular bodily exercise provides profound emotional satisfaction and a feeling of security for the aged. They also maintain that sole exploration of an intellectual sphere by the elderly person leads to a buildup of tension which can be released through physical activity.

Fait (36) stated that participation in sports and games can help an older person to maintain his or her self esteem and self concept. The socialization factor was also emphasized by Fait as being of value for the elderly.

Palmore (58) studied 127 people for a ten year period and found that decreases in activities correlated with decreased life satisfaction. It should be noted that the activities investigated included many others besides physically oriented activities.

Leake (51) discussed the physiological benefits of exercise for old people but also included the observation that training is associated with an increased feeling of well-being and mental relaxation. This feeling of well-being was also noted by Benestad (9) in his physiological study.

White (80) listed the benefits of exercise for older people. Included as a major component of this test is the effect of the psyche

of the individual. White stated that relaxation is one of the greatest benefits of physical activity for the elderly.

While there has been very little actual research focussing on the psychological effects of physical activity in older people there seem to be some general trends. An overall positive and rewarding feeling seems to accompany participation in physical activity. Until research demonstrates that physical activity participation is the cause for this feeling it would be premature to state it as such. There seems little doubt however, that involvement in physical activity is associated with, if not a factor for, positive mental attitudes in senior citizens.

Physical Activity Patterns

Research focussing on the participation patterns of senior citizens in physical activity is almost non-existent. There is an increased concern with the study of the elderly but the physical activity factor has seldom been considered in these investigations except in a physiological sense. There is very little descriptive data to establish what the actual participation patterns of older people are regarding physical activities, particularly games and sports.

Statistics Canada (74) reported in January of 1973 that of 14,714,515 people sampled from age 14 to 70, there was a consistent decrease in the amount of time spent in sports or physical activity. At age 55 and older more than 88 percent of males and 91 percent of females spent no time in sports activity and only one percent of males and four tenths of a percent of females spent over one hour per day in sports activity. The estimated time spent on all physical activity also decreased with each age group from 14 years to 70-plus years. At age 55 and older less than 10 percent of males and less than 11 percent of females spent up to

one hour per week in actual physical activity. The women are still often involved with minimal housework at this age while the men tend to be more involved with sports and recreational pastimes than women. Although this cross sectional study was carried out on a Canada-wide basis there are also figures for the "Prairie Provinces", Elderly people seem to be slightly more active in sports in the Prairie Provinces when compared to the national figures but somewhat less involved in overall physical activity. The overall conclusion to be drawn from this data is not complicated. Canadians simply become less and less involved in sports activity or physical activity as they become older. Men generally are more involved in sports activity at all ages but women are not comparatively less active in overall physical activity.

Riley and Foner (61) observed that older people in general have a large fraction of time available for leisure. Maintenance activities take up less time than leisure time. Women, however, do not usually have as much leisure time because housekeeping chores continue to be their domain. Riley et al state that the major activities of the aged are visiting, television viewing, reading and gardening. Today's older people do less outdoor activity than young people except in the areas of gardening and walking for pleasure.

Cunningham et al (30) studied the active leisure habits of males (aged 16 to 69) in Tecumseh, Michigan by the administration of a questionnaire and interview. A total of 1,929 males were studied. It was found that in general there was a decrease in active leisure participation with increasing age. In walking and gardening however, there was actually an increase in participation after 30 years of age. Otherwise it was noted that the participation decrease was greater for

the most strenuous activities. There was a general persistence of activities from group to group. That is, it appeared that people tended to choose much the same activities at older ages as they participated in when younger. There was, of course, a decrease in frequency and intensity of participation.

Cunningham (27) in another article stated that active leisure had accelerated decreases after age 20 and again after age 40. Again he maintained that leisure pursuits established early in life are not changed in older groups except in strenuous activities. His conclusion that early life experiences (prepubertal) may have a better carryover effect upon activity in adult years than postpubertal experiences has yet to be verified.

Stiles (74:892) stated that:

> The critical period for sports participation probably comes in the transition from youth to adult years; efforts should be made to participate in inexpensive but rewarding forms of physical activity.

This agrees with Cunningham in his statements that the 20 year old group is subject to rapid decreases in physical activities. Brown (15) concurs with these findings and suggests that the federal and provincial governments should see that there are physical health programs carried on past the highschool and university level. He also suggests that the local health departments should coordinate such programs and that physical educators should be involved with these physical activity programs.

While these comments are directed primarily toward the youth to adult transition period they have relevance to aging people as well. Since, as stated before, there is also a decrease in physical activity after 40 years of age and since there is a general decrease in activity persistently as people grow older it may be logical that if any of these

decreases were stopped or slowed all ages would benefit. If the physical activity level of adults is greater then perhaps the physical activity level of the aged would be greater.

Harris (44) studied men aged 40 to 59 years and found that when a positive attitude towards physical activity was formed in early life then physical activity was a meaningful part of the subjects' present life style. Even when sedentary men of the same age were put on exercise programs for one year there was an attitude change toward positive feelings about physical activity.

The sports of hunting and fishing were investigated by Sofranko et al (71) to determine if early life experiences had any effect on present levels of participation. The authors concluded that frequent participation during youth led to high current participation. They stated that job type and amount of free time were also related factors. It should be noted, however, that the sample for this study was drawn from fishing and hunting license holders so there was no way of telling how many people were active in these activities during youth but quit at a later age. Therefore the conclusion that youth participation will always lead to adult participation is a misleading one. It would perhaps be better to state simply that those people presently engaged in hunting and fishing activities were also active during their youth in those same activities.

Of importance to physical educators and recreation directors is the relationship between occupation and physical activity. Naturally those people engaged in manual work for many years were quite involved in physical activity. There is some question as to whether these people are more or less involved in active leisure than their white collar counterparts.

Cunningham et al (28) studied the physical activity at work and during leisure of 1,463 working men aged 16 to 69 years. The energy costs of occupational and leisure-time activities were estimated and the men were classified according to physical activity at the job and during leisure time. Findings showed, as would be expected, that while white collar workers spent more time at the job, the blue collar workers were engaged in significantly more physical activity in their occupations. Leisure activity differences between the two groups were negligible. Therefore it seems that occupation type did not determine the physical activity levels during leisure time. It is important to note that the blue collar workers were significantly more physically active than white collar workers for all ages up to the 60 to 69 year old group. It would appear that even manual workers have a fairly low physical activity level at the advanced ages. This would suggest that occupation is not related to physical activity levels of senior citizens.

It was also stated by Cunningham et al (29) that, except for golf, there was little or no relationship between occupation type and choice of active leisure activities. In golf, white collar workers were more active than blue collar workers. This could be due to the "image" of the game or may be an expense factor.

Occupational differences in attitudes toward aging and retirement were studied by Burgess et al (18). The attitudes of three occupational groups were studied with 301 oil company employees that were approaching retirement age. It was found that the higher the occupational status, the more prepared for retirement the employees were. Manual workers did not see retirement as an opportunity and did not consider the advantages of retirement as applying to themselves.

This difference in attitudes may have a bearing on whether or not

people take part in active leisure activities when they are older and retire. The result may be that those people with less active jobs (executives, managers, white collar workers) are in fact preparing themselves for retirement more effectively than blue collar workers with physically demanding occupations. It is possible, then, that senior citizens with less active occupational histories make more use of active leisure once retired. It is still not known whether senior citizens' physical activity levels are related to past occupational activity levels or to past leisure activity levels.

Summary

The literature indicated clearly that there is a functional physiological decline involved in the aging process of the human species. The rate of decline varies greatly from person to person and from system to system. A number of factors such as heredity, diet, lifestyle, and culture play a part in determining the rate of aging for an individual. It has been hypothesized that the physical activity history of a person also has effects on the aging process.

Studies have shown that while the aged are not as capable of physiological training as younger subjects, older people can still become more fit through physical activity. There is a training effect when old subjects take part in physical activity and generally those people who, through their lifetimes, have maintained a high physical activity level are physiologically superior to those who led a sedentary life.

There seems to be a decline in psychological functioning as well during the later years. Again this varies greatly with each individual. Much of the somewhat scanty research on the psychological effects of

exercise was done with middle-aged adults rather than the aged. However the general effect of physical activity on older people seems to be an increased feeling of well-being or relaxation. As Powell (60:18) states: "...whilst physical fitness may not add years to one's life, it can certainly give more LIFE TO ONE'S YEARS" (sic).

So although the psychological effects of exercise may not be of a purely psychological performance nature the value of emotional benefits should not be underrated. While some authors, such as Shock (65) and Skinner (70) admit that there is no conclusive proof that physical activity does slow the rate of aging, there are others, such as Andersen (3), Arnheim et al (5), and Bortz (11) who state that it does. Perhaps more important is the almost unanimous conclusion that those people who do engage in regular physical activity are superior in performance capacity to people the same age who are relatively sedentary. Therefore, while two individuals may be aging at the same rate the one who is physically active will be superior in performance capacity at any given age.

Research on activity patterns was very limited, however, some trends were noticed. It appears that physical activity usually decreases with advancing age. The transitions from youth to adulthood and from adulthood to late middle-age seem to bring about the largest decreases. There is however, a tendency for patterns and activities to persist for individuals so that the activities and relative activity levels are similar throughout life. The extent of this phenomenon is not known. Nor is it known at which times during a life the participation in physical activity is most crucial to bring about participation in the senior years.

Occupation is related to the physical activity level on the job

but may not be related to participation in leisure-time physical activity. It is also not known whether or not the occupation of a person is related to his physical activity level after retirement.

It is clear that there is a need for study in the areas of psychological effects of activity programs on senior citizens and activity patterns of senior citizens in particular.

CHAPTER III

METHODS AND PROCEDURES

The general procedure for this study included: (1) the construction of the questionnaire, (2) the selection of the sample, (3) the contact of sample and interview scheduling, (4) the interview technique, and (5) the analysis of data.

Questionnaire Construction

It was initially intended that a closed-ended questionnaire that was self-administerable would be used for this investigation. To maximize the rate of response the investigator was to bring the questionnaire to the respondent who, in turn, was to complete the questionnaire and return it immediately to the waiting investigator, This procedure was to eliminate the responsibility of the respondent to mail the completed questionnaire.

The reasons for the questionnaire being closed-ended were that (1) the administration would be brief, (2) it would be easier for respondents to recognize answers than to recall them with no assistance, (3) a minimal amount of writing would be necessary on the respondents' part, and (4) the compilation of data would be facilitated.

Consultation with representatives of municipal, provincial, and federal social service organizations within the government confirmed that a closed-ended questionnaire was most likely to yield a high rate of complete and accurate response to the questions. There was also an emphasis by these representatives on the brevity of the questionnaire. It was felt that the number of questions should be kept to a minimum in consideration to the respondents.

The questionnaire was constructed with the content divided into five general sections (appendix). Written instructions separated each section from the previous one.

The first section, including four questions, dealt with personal information such as the respondents' age, sex, marital status, and primary former occupation. It was stated that all information was strictly confidential.

The second part of the questionnaire included questions about physical activity involvement and patterns in the respondents' past. This section consisted of six inquiries.

The focus of the third set of questions was on the present attitudes of the respondent toward physical activity and the respondents' past. This section consisted of six inquiries.

The focus of the third set of questions was on the present attitudes of the respondent toward physical activity and the respondents' present physical activity patterns.

The fourth group of questions included the respondents' own preferences for physical activity. Also in this section was a question asking for a self-assessment of present physical activity level relative to other senior citizens. Another question inquired as to the satisfaction with this present physical activity level.

The last portion of the questionnaire included a thirty-five item checklist which, when completed, was used to compile past physical activity variety indexes and present physical activity participation indexes. There was provision for additional activities to be included as well as the activities already listed on the checklist.

The complete questionnaire was printed in large primary type in consideration for those whose sight was diminishing. It consisted of

eight pages, the last two of which were checklists. There were twenty-two questions and the checklist. The estimated time required for completion of the questionnaire by senior citizens was approximately one half hour.

A pilot test of the questionnaire was carried out with twenty senior citizens who were attending various functions at two of the senior citizens' centers. It was found that using the questionnaire in a self administerable manner was, for the most part, inadequate. Many of the questionnaires were incomplete and much of the information received was not usable for this study.

It was then decided that the questions would be administered verbally by the investigator. The list of response choices to each question was transferred to five by eight and a half inch laminated index cards. The questions remained the same as in the original, self administerable questionnaire. The method of administration of the questionnaire with the interview technique is discussed later in this chapter.

Selection of the Sample

Originally the sample was to be selected from a list of all senior citizens in Edmonton. Two factors prevented this: (1) there was no all inclusive list of senior citizens in Edmonton available to the investigator, and (2) while this study defined senior citizens as people aged sixty or older, most agencies and literature did not define senior citizens as anyone younger than sixty-five. This discrepency meant that people aged sixty to sixty-four would not be included on any list from these agencies. The investigator therefore chose a sample from existing, available lists which met the investigation requirements that people

sixty years and older be considered senior citizens. These lists were acquired from the membership files of three Edmonton senior citizens' centers.

The following selected senior citizens' centers were chosed to make up the total sampling frame: The Lions Club Senior Citizen Recreation Center, Strathcona Place, and The Society for Retired and Semi-Retired. All of these centers required that their members be sixty years of age or older and therefore met this study's requirements. Permission to obtain access to the membership files of these centers was secured prior to sample selection.

Sample selection was by way of random systematic technique. To attain a random sample required the elimination of membership duplications for different centers. This was done through a review of the membership lists of each center. Any name appearing in more than one list was randomly assigned to one list and stricken from the other.

It was decided to select four percent of each center's membership list, thus preserving the same proportions of people in the sample as were actually members of each center. Four percent of the total sampling frame was 199 cases.

The sample selection from each center began with a random selection from an alphabetically ordered list of members. From this start every twenty-fifth person was included in the sample and in this manner the total number of selections came to 199, or four percent of the sample population.

It was decided that people who were not contacted because of death, extended vacations, change of address, or other uncontrollable circumstances would be replaced in the sample by the next name on the membership list from which the original name was drawn. Refusals were treated as contacts

and were not replaced. Therefore the number of people actually interviewed was equal to 199 minus the refusals, or 151 respondents.

Sample Contact and Interview Schedule

The collection of data consisted of several stages. First the people selected in the sample were sent an introductory letter (appendix) which was intended to increase the response rate by attesting to the general purpose, value and legitimacy of the study.

These people were contacted by telephone within a few days. It is noted here that all telephone contacts were made by a woman because it was felt that a more positive reaction would occur on the part of the sample. It appeared that this effect was gained to some extent. An appointment was arranged, at their convenience, at which time the investigator interviewed the subject. Without exception the interviews took place at the residence of the respondent. This was partially due to the fact that the public transit system was not operating for the first three weeks of interviewing. Generally it was felt that the respondents would be more receptive and more comfortable if interviewed in their residences.

The total sample was not contacted simultaneously. About fifty people were contacted at the first stage of interviewing. As the interviews were almost complete for the first stage, the next fifty subjects, plus replacements for the first group, were contacted. It was felt that this procedure prevented long time-lags between the introductory letter and telephone contact with the subject. Using this procedure the total interviewing time was two months in length.

The average length of the interview was slightly over one half hour. The average number of interviews per day was five. All interviews were

done by the investigator.

Once all of the interviews were completed a thank-you letter (appendix) was sent to each respondent. These were very well received.

An identical retest was carried out with ten percent of the original respondents to give some indication as to the reliability of the responses, particularly those questions which referred to continuous scores such as the variety or participation indexes. The time between the original interview and the retest never was less than two weeks. The subjects for the retest were chosen periodically every ten persons on the basis of residence location, amiability and willingness to have another interview. The retest subjects were not chosen strictly at random because it was felt that such selection would not yield a full ten percent of the original respondents. The investigator is aware that the method of retest subject selection may have biased the reliability.

The Interview Technique

The procedure surrounding the actual interview has been discussed. This discussion presents the form and practice of the interview itself.

Following the pilot test with the self administerable questionnaire it was decided that an interview technique using the same questions would be more efficient and more effective.

The respondent was handed the response card corresponding to the question asked. The respondent selected his choice of response and verbally indicated that choice to the investigator who recorded the response on a coded answer sheet (appendix). There was no writing done by the respondent. A pilot test with senior citizens indicated that this technique minimized confusion and misunderstandings that had

resulted in non-usable data.

Since the investigator carried out every interview there was an effort made to keep the interviewing conditions consistent. Before each interview it was explained to the respondent how his or her name had been selected and the general procedure of the interview. If there were any other questions by the subject they were answered only if the investigator felt it would not bias the response.

Subjects were encouraged to expand, clarify, or add responses as they saw fit. If the response was considered insufficient by the investigator, further questioning was done. Usually, after the interview the respondents made inquiries regarding the study at which time their questions were answered.

Analysis of Data

Every questionnaire was examined for completeness and adequacy of usability before actual data analysis took place.

There were four indexes which were calculated from the checklists. These were: (1) youth variety index which was the total number of different activities participated in during youth, (2) middle age variety index which was the number of activities the subject was active in between age thirty and age fifty-nine, (3) present, or senior, variety index which included activities participated in within the last year, and (4) a senior physical activity participation index which was calculated by assigning each frequency column on the checklist a score and summing the total score. On the senior physical activity participation index the scoring system was as follows: one point was awarded for participation once or twice in the last year, two points were awarded for participation about once a month during the season, three points for

participation two or three times per month during the season, four points for participation about once per week during the season, and five points were awarded for participation two or more times per week during the season. The season was regarded as being relevant to those sports or activities which are seasonal such as skiing, curling, camping, golf, and lawn bowling. Other activities such as walking, alley bowling, working around the house, billiards, and dancing were assumed to have year-round seasons and were scored as such. The participation points for each activity were summed and the total score was the participation index score. It was this physical activity participation index score that was assumed to be a valid, relative measure of the subjects' present, or senior, physical activity level.

The occupation type was subjectively coded into one of three groups based on in-depth inquiry by the investigator as to the amount and intensity of physical activity required on the job. The occupational activity classification groups were: (1) sedentary, (2) moderate physical, and (3) heavy physical. Due to the extreme difficulty in assessing the physical activity involved in housekeeping those respondents who were strictly housewives were not included in the analysis of data for the occupation variable.

The data were coded on eighty-column IBM coding sheets and then punched onto IBM cards. The total data tabulation for each individual required only one card.

Using the basic S.P.S.S. (Statistical Package for Social Sciences) program, simple frequency distributions were obtained for all questions and indexes. The percentages of the sample choosing each response on the closed ended questions were reported in the form of tables and rank ordered lists. This data is purely descriptive and most of it was not

subject to any correlational analysis. It was this type of information that the senior citizens' centers required to further understand the present status of their members.

Other objectives of this study required further investigation of the relationships between variables. To carry out the statistical analysis it was first necessary to reclassify the continuous variables (youth, middle-age, and present variety indexes and physical activity participation index) into meaningful categories. They could then be treated by the proper statistical procedures (chi square test).

Each of the variety indexes were reclassified into three groups: high, average, and low. The assignment of these groups was done on a basis relative to the rest of the sample. Approximately one third of the total sample was assigned to each of the groups. The numbers varied slightly because of distribution irregularities.

The senior physical activity participation index was also recoded into categories numbering five. These categories were: inactive, slightly active, average, quite active and extremely active. Each category represented a level of physical activity participation within the last year prior to the interview. Insofar as possible each of these five groups contained twenty percent of the sample, however some variations in category size occurred because of distribution irregularities.

The data were again computerized, the second time including the reclassified variables of the variety indexes and the physical activity participation index. Since these variables were no longer continuous but were discrete categories, statistical operations regarding the relationships between variables were possible.

The statistical relationships between the following variables

were investigated: present physical activity index to age; sex; occupation type; self assessed physical activity levels in youth, middle age, and senior variety levels; senior activity satisfaction; primary present physical activity location; perceived ideal time per week for physical activity; and subjects' concept of importance of physical activity to health. The above relationships were investigated to determine if those who were most active during the last year were significantly different than the rest of the sample for those variables. Youth variety level was compared to middle age and senior variety level to indicate whether the range of activities during youth was related to the range at later life stages. Middle age variety level was cross tabulated with senior variety level to determine if there was a significant relationship. Sex was compared to youth and middle age variety levels to investigate whether or not there was a sex difference in participation in a variety of physical activities during these age groups.

Each relationship was subjected to a chi square test for independent samples according to Siegal (67) and Ferguson (37). For this study the required level of significance was set at the .05 level. The null hypothesis for each crosstabulation stated that no difference existed between the expected and observed values except that which might have been expected by chance alone. The chi square tests were automatically calculated within the S.P.S.S. program.

CHAPTER IV

RESULTS AND DISCUSSION

The results of this study refer to the data obtained, by means of interviews, from 151 senior citizens who were members of three selected senior citizens' centers in Edmonton, Alberta.

The indexes, levels, and scales referred to in the following discussion were constructed according to the methods outlined in Chapter III. They were used to facilitate data analysis and data presentation in the form of tables.

Each table is discussed regarding significance (if applicable), tendencies, and unique characteristics of either the data itself, or the method of collecting it as it relates to the results.

Response of the Sample

Four percent of the population to be sampled totalled 199 contacts. There were 48 refusals. The overall response percentage was 75.9 percent which was considered adequate for this investigation. The breakdown of response rate for each center is shown in Table 1.

Data Reliability

To determine the reliability of the response data, 10 percent of the sample was retested, repeating the original procedure exactly. The retested subjects were chosen on the basis of cooperativeness and amiability but were selected at regular periodic intervals during the original interviewing schedule. Since the scored variables (youth, middle age, senior variety indexes and senior activity participation index) were the most crucial in terms of statistical analysis the reliability of these variables was important.

TABLE I

SAMPLE COMPOSITION AND RESPONSE RATES

Population, sample Composition Information	Senior Citizen Center			
	Lions Center	Society for Retired	Strathcona Place	Total
Center membership ..Duplications Assigned	3,049	1,215	721	4,985
Percent of total sampling population	61	24	15	100
Number included in sample	121	49	29	199
Percent of total sample	61	24	15	100
Number of interviews	89	41	21	151
Number of Refusals	32	8	8	48
Response Percent	74	84	72	76

Reliability coefficients (r) were calculated for the variety indexes of youth, middle age, and senior years. The senior physical activity participation index served as a classification variable and was also subject to a reliability analysis.

The following reliability coefficients were calculated: (1) youth activity variety index, r = .92, (2) middle age activity variety index, r = .92, (3) senior activity variety index, r = .99, and (4) senior physical activity participation index, r = .98. As expected, the response reliability was less for distant past experiences than for recent

information. However all reliability coefficients were sufficiently high for this investigation.

Characteristics of the Sample

From this point on, discussion regarding the sample refers only to those 151 respondents with whom interviews were completed.

The only population characteristic that could be determined through examinations of the centers' total membership files was that of sex. Parameters such as age and marital status were not available. Therefore samples from each center were compared for representativeness of population regarding sex only. All samples were found to be representative of their respective centers and the total sample of 151 respondents was also representative of the total population. The total population consisted of 63 percent females and 37 percent males. The sample contained almost identical percentages as the population with 64 percent females and 36 percent males. A summary of the population and sample characteristics on the basis of sex is shown in Table II.

The age distribution in the sample is presented in Table III. The 1971 census figures for Edmonton (74) indicate that with each five year age group after sixty there is a decrease in the percent of senior citizens. The sample data does not show this. The under-representation of the 60 - 64 group may be due to the unwillingness of many senior citizens to become a member of any senior citizen organization. On the other hand it may be that many of the women who are members of the centers do not join until they are widowed or their husbands permanently retire. The 60 - 64 age group is also probably low because most men do not retire until forced retirement at age sixty-five. It is apparent that the

population of members in senior citizens centers is not representative of the senior citizen population in Edmonton or Alberta.

TABLE II

POPULATION AND SAMPLE SEX COMPOSITION

Population, sample Information	Senior Citizen Center		
	Lions Center	Society for Retired	Strathcona Place
Percent Females within Center Population	61	63	75
Percent Females within Center sample as selected	58	67	83
Percent Males within Center Population	39	37	25
Percent Males within Center sample as selected	42	33	17
	Males	Females	
Total Percent in Population	37	63	
Total Percent in sample	36	64	

TABLE III

AGE DISTRIBUTION OF RESPONDENTS

Age in Years	Number of Respondents	Percent of Sample	Percent in Edmonton Population 1971*
60 - 64	27	18	32
65 - 69	37	25	25
70 - 74	44	29	17
75 and over	43	28	26

* percentages of population over 60 years of age according to 1971 census, Statistics Canada (74).

Table IV represents the marital status of the sample. Most of the members (55 percent) were married with their spouse living. About a third of the sample (34 percent) were widows and the remaining 11 percent were widowers, single, divorced or separated.

TABLE IV

MARITAL STATUS OF RESPONDENTS

Present Marital Status	Number of Respondents	Percent
Married, Spouse Living	84	55
Widow	51	34
Widower	5	3
Never Married	4	3
Divorced	3	2
Separated	4	3

Youth Physical Activity Characteristics

Respondents were asked to assess themselves on a scale of physical activity prior to age 30 compared to most people at that time. The activity level choices ranged from quite inactive to extremely active (Table V).

TABLE V

SELF ASSESSMENT
OF
YOUTH PHYSICAL ACTIVITY LEVEL

Activity Level	Number of Respondents	Percent
Quite Inactive	1	1
Slightly Active	3	2
About Average	75	49
Above Average	45	30
Extremely Active	27	18

Almost all of the sample saw themselves as being about average or more active than average during their youth. Much of the activity took place while doing chores and helping out on the farm or homestead. There may be some question as to the validity of the self-assessed relative activity level since the lower activity choices may have been considered as negative by the respondents.

The affiliation with sports or physical activity clubs, teams, associations or leagues was studied. The results in Table VI indicate that most people (58 percent) did not belong to any sports organizations during their youth with only 5 percent belonging to four or more clubs

or teams at some time prior to age 30.

TABLE VI

YOUTH SPORTS CLUB AFFILIATION OF RESPONDENTS

Number of Clubs	Number of Respondents	Percent
None	88	58
One	24	16
Two	24	16
Three	8	5
Four	3	2
Five	1	1
Six or More	3	2

Probably the lack of existence of sporting and physical activity organizations in the rural setting was the main cause for the lack of organization affiliation. It was noted by the investigator that most of those people who were affiliated with several clubs or teams usually spent their youth primarily in Europe and especially in England where sports organizations were well established. It may be that most people did not belong to any form of sport aggregation simply because very few clubs, teams, or associations existed at the time in the rural setting.

A rank order list of those activities most frequently participated in prior to age 30 was constructed on the basis of the questionnaire checklist data. These findings are reported in Table VII. At least five percent of the sample participated in 33 different physical activities. The majority of the sample took part in housework, walking for exercise, hiking, gardening, dancing, baseball, and skating. Other

strenuous sports in which 10 percent or more of the sample participated were cycling, swimming, tennis, soccer, skiing, and hockey. Outdoor activities such as fishing, camping, riding, and hunting were also popular.

TABLE VII

YOUTH PHYSICAL ACTIVITY PARTICIPATION

Activity	Rank	Number of Respondents	Percent
Working Around House	1	144	95
Walking	2	133	88
Gardening	3	116	77
Dancing	4	114	75
Baseball	5	89	59
Skating	6	88	58
Hiking	7	78	52
Cycling	8	72	48
Horseback Riding	9	59	39
Swimming	10	57	38
Fishing	11	55	36
Horseshoes	12	50	33
Camping	13	44	29
Tennis	14	36	24
Hunting	15	35	23
Billiards	16	32	21
Soccer	17	31	21
Table Tennis	18	27	18
Bowling	19	20	13
Own Exercises	20	17	11
Curling	21	16	11
Skiing	21	16	11
Hockey	23	15	10
Badminton	24	14	9
Golf	25	13	9
Lawn Bowling	25	13	9
Fitness Classes	27	12	8
Volleyball	28	11	7
Basketball	28	11	7
Jogging	30	10	7
Cross Country Skiing	31	9	6
Archery	32	7	5
Cricket	32	7	5

Only those activities chosen by 5 percent or more of the sample are reported.

Many of the respondents emphasized the fact that, when they were young, there were very few bowling alleys, curling rinks, gymnasiums, golf courses or other presently available facilities. Therefore there was a lack of opportunity for these people to participate in certain facility-centered activities prior to 30 years of age.

It is likely that future and present generations of young people will have an expanded variety and extent of sport experiences since present facilities, even in rural areas, are more numerous than in the past.

Middle Age Physical Activity Characteristics

When asked to assess their physical activity level compared to most people from 30 to 60 years at that time the majority (53 percent) indicated they were about average (Table VIII). Only 3 percent thought they were below average and 44 percent thought they were above average (32 percent) or extremely active (12 percent). This distribution was quite similar to the youth assessment of physical activity level (Table V) except that there was a decline in those assessing themselves as extremely active from youth to middle age (from 18 percent to 12 percent).

TABLE VIII

SELF ASSESSMENT
OF
MIDDLE AGE PHYSICAL ACTIVITY LEVEL

Activity Level	Number of Respondents	Percent
Quite Inactive	1	1
Slightly Active	3	2
About Average	80	53
Above Average	48	32
Extremely Active	19	12

Middle age affiliation with sports clubs, teams, leagues, or associations was on the average, lower than during youth. In middle age (30 years to 59 years) there were about the same number of people who did not belong to an organization (Table IX) as during youth but there was a shift toward belonging to only one organization (from 16 percent to 29 percent).

TABLE IX

MIDDLE AGE SPORTS CLUB AFFILIATION OF RESPONDENTS

Number of Clubs	Number of Respondents	Percent
None	85	56
One	44	29
Two	14	9
Three	5	3
Four	2	2
Five	0	0
Six or More	1	1

During middle age bowling was the most common sports club affiliation of the respondents.

An attempt was made to determine what types of activities middle aged people were engaged in and where these activities took place. This was done in an effort to discover if senior citizen patterns were actually continuations of middle age patterns.

Fifty percent of the respondents said that they got most of their physical activity around their home (Table X). This was understood to include gardening, snowshovelling, working on the house, and other home-centered activities.

TABLE X

PRIMARY MIDDLE AGE PHYSICAL ACTIVITY LOCATION

Location	Number of Respondents	Percent
On the Job	59	39
Sports Events	13	8
Recreational Events	3	2
Around the House	75	50
Others	1	1

Another 39 percent got most of their physical activity on the job. This included farming and manual labor trades. Eight percent actually got most physical activity at sporting events and the remaining 3 percent through recreational and other activities.

There may be an indication here that people were quite actively engaged in their occupations and that they busied themselves around home rather than at specific activity organizations. Again it is important to note that many of the sample still may not have had local physical activity programs readily available.

Physical Nature of Primary Occupation

Discussion of the physical nature of the respondents' primary occupation type is relevant to the pre 30 years as well as the middle age years. However since most of the subjects' employment years were during the middle age category this discussion is properly included here.

The respondents were asked to identify their primary occupation with respect to their lifetime employment. Their occupation for the longest period of time was recorded as were their second and third most

lengthly occupations (if applicable). There was also inquiry as to the physical nature of the work. It was found that usually if several jobs were held that they were of a similar physical nature.

Based on these questions and observations Table XI was compiled showing the physical nature of the sample's primary job type as assessed by the investigator.

Those people not gainfully employed for 10 years or more were not classified. This applied primarily to housewives.

TABLE XI

PHYSICAL NATURE CLASSIFICATION OF RESPONDENTS' PRIMARY OCCUPATION

Physical Nature of Primary Occupation	Number of Respondents	Percent
Sedentary	31	20
Moderate Physical	21	14
Hard Physical	34	23
Not Applicable*	65	43

* Those respondents who were housewives or were not employed more than ten years were classified as Not Applicable.

It can be seen by Table XI that the sedentary occupations and the hard physical occupations were about equal in frequency with moderately physical occupations slightly lower in frequency. The sedentary workers were people such as secretaries, school teachers, bankers, and clerical people. Moderately active workers included certain tradesmen, nurses, grocery store operators and others in sub-heavy but above-sedentary jobs. Those who were classified as hard physical workers included manual laborers, farmers, and heavy physical tradesmen.

Physical Activities During Middle Age

Table XII was compiled of material from the checklists in the questionnaire (appendix). This table indicates which activities were most often participated in during middle age.

TABLE XII

MIDDLE AGE PHYSICAL ACTIVITY PARTICIPATION

Activity	Rank	Number of Respondents	Percent
Working Around House	1	143	95
Gardening	2	131	87
Walking	3	130	86
Dancing	4	102	68
Camping	5	77	51
Fishing	6	62	41
Bowling	7	55	36
Hiking	8	51	34
Horseshoes	9	50	33
Swimming	10	44	29
Curling	11	33	22
Own Exercises	12	30	20
Billiards	13	29	19
Table Tennis	13	29	19
Hunting	13	29	19
Bicycling	16	26	17
Skating	17	25	17
Fitness Classes	17	25	17
Lawn Bowling	19	23	15
Golf	20	20	13
Badminton	21	17	11
Horseback Riding	22	13	9
Baseball	23	12	8
Volleyball	24	11	7
Floor Shuffleboard	25	9	6
Tennis	25	9	6
Golf Driving	27	8	5

Only those activities chosen by 5 percent or more of the sample are reported.

Working around the house, gardening, walking, dancing, and camping were participated in by most of the sample during the middle age period.

There was an increase in youth-to-middle age participation in 14 activities, the most notable of which were bowling, camping, curling, fitness classes, individual's own exercises, golf, gardening, and lawn bowling. These are all activities which can be participated in throughout one's life. These increases might suggest that so-called "life-time" activities are, in fact, most popular during middle age.

Decline in physical activity participation from youth to middle age occurred in 26 activities. The largest declines took place in baseball, hockey, soccer, horseback riding, cycling, skating, basketball, tennis, skiing, and swimming. Lack of programs for middle aged adults and other factors such as employment and decreased physical vigour may have contributed to these declines. Most of the sports which experienced declines were of a vigourous or strenuous nature while most of the continued activities were less demanding in terms of strength and stamina.

Senior Physical Activity of Sample

Senior physical activity referred to current participation in physical activity within one year of the interview. It was, in effect, a present indication of physical activity of various aged senior citizens.

As for youth and middle age, respondents were asked to rate their physical activity level within the last year compared to most people about their age (Table XIII). The only important change as compared to the youth (Table V) and middle age (Table VIII) assessments was that only five percent of the sample thought they were extremely active compared to 12 percent for middle age and 18 percent for youth. The number of those considering themselves as below the average more than tripled. Most subjects still felt they were average (51 percent) or

above average (34 percent).

TABLE XIII

SELF ASSESSMENT
OF
SENIOR PHYSICAL ACTIVITY LEVEL

Activity Level	Number of Respondents	Percent
Quite Inactive	4	3
Slightly Active	11	7
About Average	77	51
Above Average	52	34
Extremely Active	7	5

Several questions on the questionnaire (appendix) were included to investigate the characteristics of physical activity patterns of senior citizens. Upon being asked when most of their physical activity took place the response distribution took the form of Table XIV.

TABLE XIV

SENIOR CITIZENS'
TIME SPENT ON PHYSICAL ACTIVITY

	Number of Respondents	Percent
On Own Time	120	80
During Scheduled Events	27	18
Other	4	2

Eighty percent got most of their physical activity on their own time rather than during scheduled programs or events (18 percent). While

this may not indicate a preference it does indicate a present situation. Scheduled events included such things as bowling and curling leagues, scheduled swim hours, and regular physical activity at specific times.

When asked whether they participated in physical activity most while alone or within a group, the respondents indicated that the majority of them (71 percent) got most of their physical activity when alone (Table XV). This, plus the fact that most of the sample engage in the majority of physical activity on their own time (Table XIV), tends to indicate that most of the physical activity of senior citizens is quite individualized and unstructured.

TABLE XV

COMPANIONSHIP DURING PHYSICAL ACTIVITY OF SENIOR CITIZENS

	Number of Respondents	Percent
Alone	107	71
In a Group	44	29

An effort was made to establish the location of most physical activity of senior citizens. The sample was asked where most of the physical activity engaged in within the last year took place. Table XVI presents the response.

Everyday activities such as shopping, visiting, and entertainment outside the home were chosen by 31 percent. Almost half the sample (45 percent) selected in and around the home as the primary activity site. The other 24 percent were divided among the centers (13 percent), sports facilities (6 percent) and outdoors and others (5 percent).

TABLE XVI

PRIMARY LOCATION
OF
SENIOR CITIZENS' PRESENT PHYSICAL ACTIVITY

Location	Number of Respondents	Percent
Everyday Activities	47	31
In and Around Home	68	45
At the Centers	19	13
Sports Facility	9	6
Outdoors	3	2
Others	5	3

It appears that relatively few people got most of their physical activity through facility-centered sports. The solid majority (76 percent) engaged in most of their physical activity around the home or during everyday types of activities. This does not mean that these people were not at all involved in activity programs, it simply means they did not get the majority of their activity through the programs. The data from tables XIV, XV, and XVI tended to support this.

Attitude Toward Physical Activity

One section of the questionnaire was designed to reveal the general attitude of the sample towards physical activity and its importance to them. When asked how important physical activity is to their health the wide majority (82 percent) indicated a feeling that it was very important (Table XVII). Very few people (1 percent) thought that physical activity was not important at all.

TABLE XVII

ATTITUDE OF IMPORTANCE
OF
PHYSICAL ACTIVITY TO SENIOR CITIZENS' HEALTH

Importance to Health	Number of Respondents	Percent
Very Important	124	82
Of Some Importance	25	17
Not Important	2	1

To determine whether or not people were satisfied with the amount of physical activity they had been getting in the last year most (65 percent) said that they were. Thirty-four percent indicated that they felt a need for more physical activity and one person indicated that the amount of physical activity was too much (Table XVIII).

TABLE XVIII

PRESENT PHYSICAL ACTIVITY SATISFACTION
OF
SENIOR CITIZENS

Physical Activity Satisfaction	Number of Respondents	Percent
Get Enough Activity	98	65
Get Too Little Activity	52	34
Get Too Much Activity	1	1

Thus it would seem that people were aware that physical activity is important to health and most people felt that they were getting enough physical activity.

There was, of course, the question as to what amount of physical

activity is "enough". This was subject to the individual opinion of the respondents and an effort to determine a temporal value was made.

Respondents were requested to indicate how much time per week they thought should be spent doing physical activities. Table XIX was compiled from the results of this response.

TABLE XIX

CONCEPT OF IDEAL AMOUNT
OF
PHYSICAL ACTIVITY PER WEEK FOR SENIOR CITIZENS

Number of Hours per Week	Number of Respondents	Percent
None	0	0
1 - 3 hours	11	7
4 - 7 hours	25	17
9 - 10 hours	45	30
11 or more hours	70	46

A total of 76 percent thought that an average of more than one hour a day should be spent on physical activity. This value seems inconsistent with the fact that less than 2 percent of males and 1 percent of females actually spent this much time on physical activity in the age groups 55 years and older according to 1973 Statistics Canada sources (74). It may be that the concept of what the term "physical activity" entailed was different for each study. In this investigation such activities as walking, housekeeping, gardening, and billiards were considered physical activity.

Reasons For and Against Activity Participation

To motivate older people into physical activity participation it is first necessary to determine their reasons for and against physical activity participation. Due to the great variability in individual motives behind physical activity participation the respondents were told to choose the four most important reasons from a list (appendix). The reasons for getting involved in physical activity were not priorized. Table XX conveys the response distribution.

TABLE XX

MOST IMPORTANT REASONS
FOR
PHYSICAL ACTIVITY OF SENIOR CITIZENS

Reasons for Physical Activity	Number of Respondents	Rank	Percent
Concern for Health	105	1	70
To Relieve Tension	97	2	64
To Get Exercise	89	3	60
Pleasure of Feeling Good	78	4	52
Being with Friends	63	5	42
It Helps Pass the Time	59	6	39
Because it is Necessary	36	7	24
Welcome Change	19	8	13
Just for Fun	19	8	13
Excitement of Activity	18	10	12
To Learn New Skills	16	11	11
Others	4	12	3

There seemed to be a very positive response (70 percent) to the health aspect of activity again. A cathartic effect also ranked as a positive response (64 percent). To get exercise and the pleasure of feeling good also were chosen by the majority of the sample (60 percent and 52 percent respectively). The social element of physical activity was emphasized by the 42 percent choosing being with friends as a major reason. The use of physical activity to simply help pass the time was considered important by 39 percent.

It was interesting to note that of the top four reasons there was a mixture of psychological and physiological elements. The lowest four reasons were mostly psychological with the learning of new skills and excitement of activity being the least chosen.

Reasons for not participating in more physical activity were also investigated (Table XXI). Each respondent was allowed two choices as to the most important reasons for not getting more physical activity. Many people did not choose any or selected only one.

Transportation problems (28 percent) were mainly concerned with inconvenient bus routes to the centers and long transfer layovers, particularly in bad weather. Many of the sample did not drive and relied strictly on relatives, friends, and public transportation. The frequent use of taxi cabs was prohibitive financially.

Poor health (23 percent) included anything from severe physical handicap to generally weak health. It was noted here that only 8 percent saw themselves as too old to participate in more physical activity than they were currently getting.

It was also noted that many respondents simply said they were "too lazy" rather than choosing "do not want to" as a reason.

TABLE XXI

PRIMARY REASONS
FOR
SENIOR CITIZENS NOT GETTING MORE
PHYSICAL ACTIVITY

Physical Activity Preventing Reasons	Number of Respondents	Rank of Reason	Percent
Transportation Problems	42	1	28
Poor Health	35	2	23
Change of Interests	16	3	11
Cannot Afford It	14	4	9
Not Enough Time	13	5	9
Too Old	12	6	8
Desired Activity Not Available	6	7	4
Do Not Want To	2	8	1
Others	2	8	1

Physical Activity Preferences

There were two questions dealing with the preference of the sample for the organization of their physical activity.

TABLE XXII

PHYSICAL ACTIVITY ORGANIZATIONAL PREFERENCE
OF
SENIOR CITIZENS

Preferred Organization	Number of Respondents	Percent
Organized Program	45	30
Own Time and Own Place	76	50
No Preference	30	20

Half of the sample (50 percent) preferred to get their physical activity on their own time and at their own place (Table XXII). This response does not exclude taking part in a program that is not at a regular, scheduled time. Thirty percent said they did prefer an organized program and 20 percent had no preference.

These responses may imply that to obtain maximal participation of senior citizens in physical activity, programs should be flexible enough to allow individual informal activity as well as scheduled, regular activity.

To determine what location the sample preferred for physical activity the respondents were asked where they felt would be the best place for physical activity. Table XXIII shows the response.

TABLE XXIII

PREFERRED PHYSICAL ACTIVITY LOCATION
OF
SENIOR CITIZENS

Preferred Location	Number of Respondents	Percent
At Home	49	33
At an Activity Center	54	35
No Preference	48	32

One third of the respondents (33 percent) preferred to get their physical activity around their home while another third (35 percent) chose at an activity center. Essentially the rest (32 percent) had no particular preference.

Actually the response "at an activity center" was conveyed to the respondents as including bowling alleys, swimming pools, and other sports

facilities as well as senior citizens centers. Again the fact that people may prefer to get their physical activity at home does not necessarily mean they would not like individualized programs that they can do on their own at home or in a location of their choice.

The last part of the questionnaire (appendix) concerned with physical activity preferences involved each respondent listing five activities he would most like to take part in (Table XXIV). These activities could be ones that the respondent had never done or ones in which the respondent was still actively engaged. They could be sports or games on a competitive level or physical activities of a practical productive nature such as gardening. Many times the respondent chose some of these activities from the checklist after reviewing it. The choices were not priorized.

Walking for exercise was the most popular choice (72 percent). Gardening (53 percent) and bowling (52 percent) were also picked by the majority of the sample. Swimming, dancing, camping, and working around the house were other popular choices. Fitness classes (including health spas), lawn bowling, golf, hiking, curling, own exercises, fishing, and floor shuffleboard all received over 10 percent choice rates.

It is noteworthy that the list of preferred activities included primarily activities that can be engaged in at a moderate or low energy expenditure. This is not to say that more strenuous activities such as tennis, squash, and badminton could not be successfully participated in by older people. In fact, with some people this was exactly the case. Generally, however, it appears that the preferences of the sample were based on what they considered appropriate activities for their age. Likely past activity experience also played a part in influencing choices

of activities.

TABLE XXIV

PREFERRED PHYSICAL ACTIVITIES
OF
SENIOR CITIZENS

Physical Activity*	Number of Respondents	Rank	Percent
Walking for Exercise	108	1	72
Gardening	80	2	53
Bowling	78	3	52
Dancing	65	4	43
Swimming	57	5	38
Working Around House	40	6	27
Camping	29	7	19
Fitness Classes	23	8	15
Lawn Bowling	23	8	15
Hiking	22	10	14
Golf	22	10	14
Curling	22	10	14
Own Exercises	21	13	14
Floor Shuffleboard	17	14	11
Fishing	16	15	11
Skating	14	16	9
Billiards	10	17	7
Bicycling	10	17	7
Horseshoes	8	19	5
Horseback Riding	5	20	3
Hunting	5	20	3

*Only those physical activities chosen by five or more respondents are listed.

It may well be that as younger generations become old there will be a shift in activity preference based on the differences in activity experience. It would be fallacious to assume that because the senior citizens of present prefer certain activities, that only these activities should be presented at younger ages because of carryover value. It may be that many other activities have a valid carryover value but simply because people did not have the opportunity to participate in them earlier in life, they are not popular with senior citizens.

For today's senior citizens however, it appears that activities such as listed in Table XXIV are most appropriate and should be included in activity programs. They are probably the most familiar activities as well as the most accepted by the senior citizens themselves. Hence the inclusion of these types of activities in senior citizen physical activity programs will probably bring about maximum participation.

Current Senior Citizen Physical Activity Participation

As was done for youth (Table VII) and for middle age (Table XII) a list of those activities in which senior citizens participated was constructed (Table XXV). Again, as in youth and middle age, the activities of walking, working around the house, gardening, and dancing were in the top five activities although the actual frequencies were lower than before.

A total of 32 physical activities declined in participation from middle age to senior citizens. The largest declines were in fishing, camping, gardening, and horseshoe throwing. It was noted, however, that camping and gardening were still among the most popular activities in the senior age group. Most of the strenuous activities such as baseball, soccer, hockey, tennis, and skiing were completely eliminated from the participation list.

While many activities had an increased rank in senior years compared to middle age, these changes were usually due to the slower rate of decline relative to other activities. For example, bowling changed from rank seven to rank six but actually was participated in by only half as many people as during middle age.

TABLE XXV

SENIOR PHYSICAL ACTIVITY PARTICIPATION

Activity	Rank	Number of Respondents	Percent
Walking	1	130	86
Working around House	2	128	85
Gardening	3	95	63
Own Exercises	4	83	55
Dancing	5	69	46
Hiking	6	28	19
Bowling	6	28	19
Camping	8	27	18
Billiards	8	27	18
Swimming	10	23	15
Fishing	11	22	15
Floor Shuffleboard	12	16	11
Horseshoes	12	16	11
Table Tennis	14	15	10
Fitness Classes	15	13	9
Golf	16	9	6
Curling	17	7	5
Golf Driving	18	5	3
Lawn Bowling	18	5	3
Cycling	18	5	3
Job	18	5	3
Jogging	18	5	3
Skating	23	4	3
Hunting	23	4	3
Badminton	25	3	2
Skidooing	25	3	2
Volleyball	27	1	1
Cross Country Ski	27	1	1

All activities participated in by senior citizens are reported.

There were three activities however, which did experience an increase in participation. These were: own exercises, floor shuffleboard, and snowmobiling. Skidooing (snowmobiling) probably increased because of the fact that there simply were not any ski-doos during the sample's middle age years. Still, only 3 people had engaged in snow-mobiling. Shuffleboard had increased probably as a result of the expanding availability of shuffleboard facilities in senior citizen centers, apartments, and institutions. The greatest, and most positive change from middle age to

old age took place in the number of people doing their own exercises. There was an increase from 30 participants to 83 participants, a change of almost 35 percent of the sample. When questioned about this activity many respondents stated that they realized that there was a need for physical activity and that they met this need through purposeful exercises. Most of these exercises were of a flexibility-increasing nature and did not involve endurance-type situations.

Senior Citizen Physical Activity Variety

Discussions thus far have been centered around the comparison of the type of activities participated in for the three age groupings: youth (up to 29 years old), middle age (30 to 59 years old), and senior (60 or more years old). There have been some suggestions that older people take part in fewer activities as well as to a lesser extent. Table XXVI shows the decline in the number of physical activities engaged in with increasing age.

TABLE XXVI

COMPARISON OF AGE GROUPS FOR PHYSICAL ACTIVITY VARIETY

Physical Activity Variety Measures	Age Group		
	Youth	Middle Age	Senior
Mean Number of Activities	9.79	8.09	5.19
Range of Activities	19 (3 to 22)	19 (2 to 21)	15 (1 to 16)
Most Common Number of Activities (Mode)	9	7	3

The table implies that a very large decrease in variety of physical activity occurs from middle age to senior citizen years. It should be remembered that many of the activities may have been discontinued before sixty years of age but would still appear on the middle age list. That is, the drop from middle age to senior years may be, and probably is, more gradual than the table would indicate.

It is important to note that the variety index is not necessarily a measure of the extent of physical activity. Any one person could be quite active and yet have a low variety index because he restricts himself to extensive activity in a narrow field of activities.

Activity Participation Related to Sample Characteristics

It is useful to study the physical activity patterns of the aged and to describe these patterns in conjunction with other factors. Thus far in this chapter the discussion has been primarily descriptive of characteristics, habits, background, and the preferences of the selected sample. However, to fully achieve the goals of this study it was necessary to investigate the relationships between these factors as well as the factors themselves. It is in this area of relationships that the origins and results of the physical activity patterns of senior citizens may be analyzed.

The senior physical activity participation index (participation index) was constructed on the basis of the questionnaire checklists (appendix) and served as a measure of the extent of physical activity engaged in by the respondents within the last year prior to the interviews. It was subdivided into five, approximately equal, groups of varying physical activity levels. These groups ranged from inactive to extremely active. The participation index was used in many comparisons to determine

if various factors were significantly related to the respondents' physical activity levels.

A chi square test of significance was used to analyze these relationships. The use of this statistic is supported and outlined by Siegel (67) and Ferguson (37).

Table XXVII indicated that although there was a tendency for males to be more active than females in the senior years, the relationship was not significant at the .05 level. Many women, while not involved with sport, were quite active in gardening and working around the house.

TABLE XXVII

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' SEX

Respondents' Sex	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	7	(5)	9	(6)	13	(9)	9	(6)	16	(10)
Female	23	(15)	21	(14)	21	(14)	18	(12)	14	(9)

$X^2 = 6.643$ d.F 4 P .1560

Likewise, Table XXVIII showed no significant relationship between physical activity participation of senior citizens and age. Again there was a general tendency for the older groups to have more cases in the low activity classification but the relationship was not statistically significant at the .05 level. The table did support the contention that physical activity decreases with age but perhaps the fact that the sample was selected from a likely relatively active population de-emphasized

the effects of age.

TABLE XXVIII

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' AGE

Respondents' Age	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
60 - 64	3	(2)	4	(3)	5	(3)	7	(5)	8	(5)
65 - 69	4	(3)	10	(7)	7	(5)	6	(4)	10	(7)
70 - 74	12	(8)	6	(4)	14	(9)	5	(3)	7	(5)
75 plus	11	(7)	10	(7)	8	(5)	9	(6)	5	(3)
X^2 = 15.657				d.F 12					P .2074	

Investigation into the relationship between primary activity location and physical activity extent took place (Table XXIX) to disclose whether or not those who were most active or least active were significantly different in their choice of activity location. As before a tendency seemed to be present, with the average and above average groups containing more cases of subjects who engage in most of their activity at sports facilities and in the out-of-doors. The relationship was not significant by the standards of this study.

Physical Activity Level and Attitude

It was also decided to determine the relationship between the extent of physical activity participation and the various preferences and attitudes of the sample toward physical activity.

When questioned regarding the importance of physical activity on

health over 80 percent stated that it was very important. To determine if this response was related to physical activity level, an analysis the two factors was carried out (Table XXX).

TABLE XXIX

SENIOR PARTICIPATION INDEX IN RELATION TO PRIMARY PHYSICAL ACTIVITY LOCATION

Primary Activity Location	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Everyday Activity	13	(9)	10	(7)	9	(6)	9	(6)	6	(4)
Around Home	12	(8)	16	(11)	18	(12)	10	(7)	12	(8)
At Centers	5	(3)	4	(3)	3	(2)	4	(3)	3	(2)
Sport Facility	0		0		3	(2)	2	(1)	4	(3)
Outdoors	0		0		1	(1)	0		2	(1)
Others	0		0		0		2	(1)	3	(2)

$X^2 = 26.266$ d.F 20 P .1572

TABLE XXX

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' ATTITUDE OF PHYSICAL ACTIVITY IMPORTANCE TO HEALTH

Concept of Importance To Health	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Very Important	24	(16)	24	(16)	27	(18)	24	(16)	25	(17)
Of some Importance	6	(4)	4	(3)	7	(5)	3	(2)	5	(3)
Not Important	0		2	(1)	0		0		0	

$X^2 = 9.506$ d.F 8 P .3014

There was not a significant relationship at the .05 level with responses being fairly evenly distributed among the various participation index groups. The concept of importance of physical activity to health was apparently similar for all of the sample regardless of physical activity habits.

A relationship between the satisfaction of various respondents' with their present physical activity level could yield two conclusions. Firstly those who were most active could be satisfied while those who were least active could, in recognition of their status, be least satisfied. On the other hand the most active people may yearn to be more active by the same motivation which had prompted their already superior activity level. Likewise those who were least active may be quite satisfied with their state because of no aspirations for more activity. There is an element of individual standards and values which

this study was not designed to investigate fully.

There was a question regarding satisfaction which asked how the respondent felt about the amount of physical activity that he or she had been engaged in within the last year. The results reported in Table XXXI showed no relationship between physical activity participation index and satisfaction of activity level.

TABLE XXXI

SENIOR PARTICIPATION INDEX IN RELATION TO SENIOR ACTIVITY LEVEL SATISFACTION

Senior Activity Level Satisfaction	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Enough	20	(13)	18	(12)	20	(13)	19	(13)	21	(14)
Not Enough	10	(7)	12	(8)	14	(9)	7	(5)	9	(6)
Too Much	0		0		0		1	(1)	0	

$X^2 = 6.624$ d.F 8 P .5777

As a follow-up to the question regarding satisfaction of activity level, the respondents were asked how much time per week they thought they should spend on physical activity.

Table XXXII indicates there was not a significant relationship between senior participation index and the choice of ideal amount of time per week spent on physical activity. Each level of activity tended to choose over 8 hours per week. It may be interesting to note that the extremely active group most heavily supported the 11 plus hours response. This was not unexpected. The largest single choice of the

inactive group was also 11 plus hours per week.

TABLE XXXI

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' CONCEPT OF IDEAL AMOUNT OF TIME PER WEEK FOR PHYSICAL ACTIVITY

Ideal Time Per Week	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
1 - 3 hrs	3	(2)	4	(3)	2	(1)	2	(1)	0	
4 - 7 hrs	6	(4)	5	(3)	10	(7)	2	(1)	2	(1)
8 - 10 hrs	9	(6)	10	(7)	7	(5)	9	(6)	10	(7)
11 plus hrs	12	(8)	11	(7)	15	(10)	14	(9)	18	(12)

$X^2 = 14.453$ d.F 12 P .2727

It appeared that in terms of sample characteristics being related to physical activity participation of senior citizens there were no significant comparisons to report. One confounding factor which may have made a statistical difference was the assigning of several handicapped people to the inactive group. There were several subjects who had been extremely physically active throughout their lives but who had, in the last ten years, been very inactive due to severe handicaps. While their recent inactivity relegated them to the inactive classification, their attitudes may have been more consistent with the higher activity groupings. Therefore in cases of chi squares which were insignificant it may be that these handicapped subjects' responses coming from the inactive group prevented a higher chi square and a better chance of significance.

Past Physical Activity Trends of the Sample

One of the purposes of this study was to investigate the relationships between senior activity patterns and past activity patterns. This section of discussion deals with some of the characteristics of the respondents' past activity patterns.

Since the study did not attempt to obtain a participation index for past activity, the variety index was used in analysis of past trends in activity.

First the relationship between youth variety index and sex was studied. As might be expected, there was a significant chi square resulting from this analysis (Table XXXIII).

Women, during youth, had significantly less opportunity to take part in a variety of physical activities. When the sample was young, some forty years prior to this study, women were simply not encouraged to be physically active outside domestic limits. Many of the women in the sample stated that they were forbidden to take part in recreational sport such as skating, skiing, cycling and so forth.

TABLE XXXIII

YOUTH VARIETY INDEX IN RELATION TO RESPONDENTS' SEX

Youth Variety Index	Respondents' Sex			
	Male		Female	
	No.	%	No.	%
Low	10	(7)	37	(25)
Middle	13	(9)	34	(23)
High	31	(21)	26	(17)

$X^2 = 14.242$ d.F 2 P .0008

As Table XXXIV indicates this phenomenon continued into the adult and middle age years. Again the chi square was significant at the .05 level.

TABLE XXXIV

MIDDLE AGE VARIETY INDEX IN RELATION TO RESPONDENTS' SEX

Middle Age Variety Index	Respondents' Sex			
	Male		Female	
	No.	%	No.	%
Low	12	(8)	42	(28)
Middle	11	(7)	28	(19)
High	31	(21)	27	(18)

X^2 = 13.176 d.F 2 P .0014

The relationship between the variety index in youth and the variety index in middle age was also studied (Table XXXV).

TABLE XXXV

YOUTH VARIETY INDEX IN RELATION TO MIDDLE AGE VARIETY INDEX

Youth Variety Index	Middle Age Variety Index					
	Low		Middle		High	
	No.	%	No.	%	No.	%
Low	27	(18)	15	(10)	5	(3)
Middle	19	(13)	15	(10)	13	(9)
High	8	(5)	9	(6)	40	(26)

X^2 = 43.387 d.F 4 P .0000

A significant chi square was calculated indicating that those who engaged in a high variety of physical activities during youth also engaged in a wide variety after 30 years of age. Likewise respondents with a narrow range of physical activities during youth had a narrow range during middle age.

This relationship is of course, sex related in that men had more opportunity during both age periods to participate in a wide variety of physical activity. However the trend was also supported by data from the female subjects in the sample. This result agrees with the findings of Cunningham (30).

Effects of Past Physical Activity Patterns of Senior Activity Participation

This section of discussion deals with the interaction of past physical activity patterns with senior citizen physical activity participation index. It discusses the differences between active senior citizens and inactive senior citizens in terms of self assessed past activity levels, past variety levels, and past occupation type.

Although it was recognized by the investigator that the respondents' self assessments of past physical activity level is of questionable validity it was decided that to ask specific participation frequency questions would be unreasonable. Therefore the self assessment approach was used in an attempt to keep the questionnaire as brief as possible and still obtain relative information pertaining to past physical activity level.

When the sample was asked to assess their relative activity level during youth (up to 30 years old) the results occurred as shown in Table XXXVI.

The very small number of people estimating their activity levels as below average were a confounding factor. Perhaps this was because of a possible negative connotation connected with below average activity level. Analysis of only the most active and least active senior citizens would probably support the theory that those active in youth were likely to be active in senior years but the total relationship with all groups included was not significant at the .05 level.

TABLE XXXVI

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' SELF ASSESSED YOUTH ACTIVITY LEVEL

Youth Self-Assessed Activity Level	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Inactive	0		0		0		1	(1)	0	
Slightly Active	0		2	(2)	0		1	(1)	0	
Average	19	(13)	13	(9)	18	(12)	15	(10)	10	(7)
Above Average	8	(5)	9	(6)	9	(6)	6	(4)	13	(9)
Extremely Active	3	(2)	6	(4)	7	(5)	4	(3)	7	(5)

$X^2 = 17.898$ d.F 16 P .3299

Similar results were obtained when the interaction between self assessed middle age activity level and senior activity participation was determined. As the information (Table XXXVII) demonstrates the two factors were not significantly related.

TABLE XXXVII

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' SELF ASSESSED MIDDLE AGE ACTIVITY LEVEL

Middle Age Self-Assessed Activity Level	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Inactive	0		0		0		0		1	(1)
Slightly Active	0		1	(1)	1	(1)	1	(1)	0	
Average	21	(14)	16	(11)	17	(11)	15	(10)	11	(7)
Above Average	7	(4)	10	(7)	11	(7)	8	(5)	12	(8)
Extremely Active	2	(1)	3	(2)	5	(3)	3	(2)	6	(4)

X^2 = 13.144 d.F 16 P .6622

Again the small number of people assessing their middle age levels as below average may cast doubt on the self assessment method of determining past physical activity level. Even so, only nine people of the inactive group assessed themselves as being above average activity in middle age. Eighteen of the extremely active group assessed themselves as above average activity in middle age. However the tendency does not hold for the middle three senior citizen groups (based on senior participation index).

As a test of the validity of the self assessment technique the respondents' were also asked to assess their present relative physical activity level. This was compared to the actual participation index scores obtained through checklist data (Table XXXVIII).

TABLE XXXVIII

SENIOR PARTICIPATION INDEX IN RELATION TO RESPONDENTS' SELF ASSESSED SENIOR ACTIVITY LEVEL

Senior Self Assessed Activity Level	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Inactive	2	(1)	2	(1)	0		0		0	
Slightly Active	4	(3)	4	(3)	2	(1)	1	(1)	0	
Average	19	(13)	18	(12)	19	(13)	14	(9)	7	(5)
Above Average	5	(3)	5	(3)	13	(9)	11	(7)	18	(12)
Extremely Active	0		1	(1)	0		1	(1)	5	(3)

$X^2 = 42.012$ d.F 16 P .0004

The respondents' were very accurate when they assessed their senior activity levels and the chi square was significant.

This data seemed to support the self assessment technique of physical activity level while Tables XXXVI and XXXVII tended to refute it. There are two explanations for this discrepancy. One is that people can assess recent activity level but the recollection element of assessing past activity level renders these assessments less than accurate. Secondly, as discussed earlier in this chapter, there were a number of senior citizens who became physically handicapped or impaired. They were assigned to the inactive group in terms of senior activity level but assessed themselves, and rightly so, as being above average in past physical activity age groupings.

It was also of interest to the investigator to determine if past variety of activity participation was connected to present, or senior, physical activity level. It was found that the youth variety level did not significantly relate to senior activity level (Table XXXIX).

Many of the people in the inactive group participated in a wide variety of activities during youth and therefore the youth variety-of-activity level did not seem directly related to senior activity level.

TABLE XXXIX

SENIOR PARTICIPATION INDEX IN RELATION TO YOUTH VARIETY INDEX

Youth Variety Index	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low	11	(7)	12	(8)	13	(9)	8	(5)	3	(2)
Middle	7	(5)	9	(6)	10	(7)	9	(6)	12	(8)
High	12	(8)	9	(6)	11	(7)	10	(7)	15	(10)

$X^2 = 9.335$ d.F 8 P .3148

When middle age variety level was compared to senior participation index a significant relationship was discovered (Table XL).

This relationship suggests that those people who participated in a wide variety of physical activity during the middle age period were also the most active senior citizens. The reason for this interaction is not known. Perhaps a wide range of activity experiences during middle age allowed people to adjust to aging processes and continue on, or take up, new activities. On the other hand it could be that a wide variety of

middle age activities simply meant that it was more likely that the subject was participating in at least a few carry-over activities which he or she could continue in the senior years.

TABLE XL

SENIOR PARTICIPATION INDEX IN RELATION TO MIDDLE AGE VARIETY INDEX

Middle Age Variety Index	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low	18	(12)	15	(10)	7	(5)	9	(6)	5	(3)
Middle	6	(4)	7	(5)	14	(9)	6	(4)	6	(4)
High	6	(4)	8	(5)	13	(9)	12	(8)	19	(13)

$X^2 = 24.851$ d.F 8 P .0016

Senior variety level was also significantly related to senior physical activity participation index (Table XLI).

This relationship may in fact have been a significant one but a major weakness in the design also may have caused it. The system of calculating physical activity participation index involved awarding a maximum of 5 points for any one activity. In this manner a respondent who engaged in an activity regularly every day would be awarded 5 points.

Likewise a person participating in 5 separate activities, each once a year, would also receive 5 points although he was a great deal less active overall. The only way to achieve a large participation score was to have a reasonable variety of activity as well.

TABLE XLI

SENIOR PARTICIPATION INDEX IN RELATION TO SENIOR VARIETY INDEX

Senior Variety Index	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low	28	(18)	19	(13)	0		0		0	
Middle	2	(1)	11	(7)	27	(18)	5	(3)	0	
High	0		0		7	(5)	22	(15)	30	(20)

$X^2 = 187.002$ d.F 8 P .0000

While this weakness may seem to be of major importance it was noted by the investigator that it was not an extensive problem. Activities which did occur at very frequent, or daily, intervals tended to accumulate 5 points for every one. Such activities included gardening, housework, and walking. The points assigned for these activities generally did not change the relative positions of subjects. Most other common activities (dancing, hiking, bowling) were not participated in more than once or twice per week so the scores assigned for these activities were accurate on a relative basis.

Despite the weakness in the scoring system it was quite likely that those participating in a wide variety of activities were also relatively more active overall.

Occupation Related to Physical Activity

There has been some research (28, 29) into the relationship of physical activity during leisure time to the physical activity required

in an occupation. Generally it was found that physical requirements of occupation did not have a significant interaction with the amount of leisure-time physical activity engaged in.

The review of literature revealed that there has been no work completed regarding the interaction of physical nature of occupation with physical activity level after retirement. The question as to whether or not past job type was related to senior citizens' physical activity patterns had not been answered.

Table XLII shows the results of investigation into the relationship of past occupation type and senior participation level. There was not a significant relationship although if only the most active and least active groups were compared a tendency was apparent. It appeared that the sedentary employees were generally less active than those who had retired from active physical jobs.

TABLE XLII

SENIOR PARTICIPATION INDEX IN RELATION TO PHYSICAL NATURE OF RESPONDENTS' PRIMARY OCCUPATION TYPE

Physical Nature of Job Type	Senior Participation Index									
	Inactive		Slightly Active		Average		Quite Active		Extremely Active	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sedentary	8	(9)	5	(6)	5	(6)	7	(8)	6	(7)
Moderate Physical	4	(5)	7	(8)	4	(5)	2	(2)	4	(5)
Hard Physical	4	(5)	5	(6)	8	(9)	6	(7)	11	(13)

$X^2 = 7.456$ d.F 8 P .4883

Effects of Past Physical Activity Variety on Senior Activity Variety

It may be, because of the self-assessment problems discussed earlier in this chapter, that variety index was a more accurate indication of past physical activity levels. With this in mind the past variety indexes were analyzed in conjunction with the senior variety level. This was done to determine to what extent, if any, a wide variety of past activity experiences led to a wide variety of senior physical activity participation.

First the respondents' youth variety index was cross-tabulated with senior variety index (Table XLIII). There was not a significant relationship at the .05 level. This indicated that perhaps the majority of the subjects were active in a wide range of activities during youth and were all quite similar at that time.

TABLE XLIII

YOUTH VARIETY INDEX IN RELATION TO SENIOR VARIETY INDEX

Youth Variety Index	Senior Variety Index					
	Low		Middle		High	
	No.	%	No.	%	No.	%
Low	19	(13)	14	(9)	14	(9)
Middle	12	(8)	16	(11)	19	(13)
High	16	(11)	15	(10)	26	(17)

$X^2 = 4.148$ d.F 4 P .3862

When the relation between middle age and senior variety index was studied the results were as shown in Table XLIV.

TABLE XLIV

MIDDLE AGE VARIETY INDEX IN RELATION TO SENIOR VARIETY INDEX

Middle Age Variety Index	Senior Variety Index					
	Low		Middle		High	
	No.	%	No.	%	No.	%
Low	27	(18)	16	(11)	11	(7)
Middle	9	(6)	16	(11)	14	(9)
High	11	(7)	13	(9)	34	(22)

$X^2 = 23.065$ d.F 4 P .0001

A significant chi square was obtained indicating that the range of activities a person experienced, after 30 years of age, was quite related to his senior range of physical activities. These results plus those of Table XXXIII (Middle age variety index vs. senior physical activity level) seemed to imply that the middle age years after 30 were crucial in terms of affecting senior activity variety levels. While senior activity variety level was not related to youth patterns it was quite related to middle age patterns.

Generally the results indicate that the activity patterns during middle age were more related to senior citizen physical activity than activity patterns during youth. The variety of physical activity experiences seemed especially important.

It was also evident that sex was related to past physical activity habits, with women taking part in lower variety of activity than men.

Occupation type was not significantly related to senior physical activity participation. A more complete examination of occupation may yield more complete and clarified results.

It appeared that, within the limitations of this study, the physical activity participation of senior citizens is more a function of middle age activity patterns than of youth activity patterns. This suggests that additional emphasis should be placed on physical activity during middle age if physical activity during the senior years is to be maximized and that this emphasis should extend through a wide variety of activities and experiences. Both males and females should be subject to the exposure of physical activity.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The purpose of this study was to gather and provide information related to past and present physical activity patterns of senior citizens who were members of selected senior citizens' centers in Edmonton, Alberta, Canada.

The sampling frame included the total membership of three senior citizens centers. These were the Lions Club Senior Citizen Recreation Center, Strathcona Place, and the Society for Retired and Semi-Retired. The sample consisted of 199 people, or 4 percent of the total sampling frame. Of these, 151 people (75.9 percent of original sample) were interviewed by the investigator.

The interview involved closed-ended questions with the respondent choosing his or her answer from a list of responses. A checklist was also involved which indicated past physical activities of the respondent and the frequency of participation in various physical activities by the respondent within the last year prior to the interview.

The numbers and percentages of people choosing the various responses for each question and the total percent participation for the physical activities were calculated and reported in terms of past and senior patterns of participation.

Based on checklist data each respondent was classified according to physical activity variety levels in youth, middle age, and senior years. Senior citizens were also classified as belonging to one of five activity levels (inactive, slightly active, average, quite active, extremely active) on the basis of senior participation index scores.

Chi square analyses were subsequently applied to determine the significance of the relationships between senior physical activity participation level and each of the following factors: age, sex, concept of importance of activity to health, primary senior activity location, concept of ideal time per week for physical activity, activity level satisfaction, self assessed youth activity level, self assessed middle age activity level, self assessed senior activity level, and the physical nature of past primary occupation type.

To study past physical activity relationships a chi square analysis was also used to investigate the relationships between: youth activity variety and sex, middle age activity variety and sex, youth activity variety and middle age activity variety.

To determine the relationships between past and present (senior) variety levels of physical activity the following factors were subjected to chi square analysis: youth activity variety versus senior activity variety, middle age activity variety versus senior activity variety.

These eighteen relationships were subjected to analysis and, together with reported frequency tables and percentages, constituted the findings and results.

Findings and Results

By observing the response distributions to the questions in the interview certain trends, characteristics, and information regarding the past and present activity patterns of the sampled senior citizens were apparent.

Today's senior citizens generally assessed their pre-thirty years as average or above average in terms of physical activity. Yet sports organization affiliation was very limited at that time. The activities

which were most frequently participated in during youth were, in rank order, (1) working around the house, (2) walking, (3) gardening, (4) dancing, (5) baseball, (6) skating, (7) hiking, (8) cycling, (9) horseback riding, and (10) swimming. The first seven activities were engaged in by over half the sample during youth.

Most respondents assessed their middle age activity level as average or above average but there was a slight decrease in the number of people assessing themselves as extremely active when compared to youth activity assessments. As in youth there was a low degree of sports organization affiliation in this sample. The vast majority of the sample engaged in most of their physical activity around home or at the job during middle age.

From age thirty to age sixty the most participated-in activities were, in rank order, (1) working around the house, (2) gardening, (3) walking, (4) dancing, (5) camping, (6) fishing, (7) bowling, (8) hiking, (9) horseshoes, and (10) swimming. Only the first five activities polled over half the sample.

Changes in activity characteristics from youth to middle age showed a decreased participation in 26 activities and an increase in 14 activities. The most notable decreases were in baseball, soccer, hockey, riding, tennis, skating, swimming, skiing, basketball, and cycling. Bowling, camping, curling, personal exercise, and golf were among the large increases in participation.

Occupation characteristics were found to be almost equally divided between active physical work and sedentary work with moderate physical work being slightly less in frequency. Housewives were not classified.

When senior citizens assessed their present activity levels,

relative to others about their age, most still chose average or above average. Until it is known whether or not this sample is generally representative of the total population of senior citizens there is no way of knowing whether these self assessments were accurate or not. It could be that sampling from senior citizen center members means that the sampling population itself may be biased when compared to the overall population of senior citizens. If this was true then the self assessments could all be accurate with everyone being more active than average.

The majority of respondents got most of their physical activity alone and on their own time working around home or during everyday activities such as shopping and visiting. Physical activity was thought to be very important to health and about two thirds of the sample felt they did engage in enough activity while the other third thought they needed more. Over three quarters of the sample said that eight hours or more was the ideal amount of time per week spent on physical activity for people their age.

The primary reasons given for taking part in physical activity were, in rank order, (1) concern for health, (2) to relieve tensions, (3) to get exercise, (4) for the pleasure of feeling good. The least chosen reason was to learn new skills. The main reasons for not getting more activity were transportation problems and poor health.

While half the sample preferred to get their activity on their own time and place the other half preferred organized programs or had no preference. Preference for activity location was fairly equally divided between home, activity centers, and no preference.

As to the most preferred activities the following were the ten most

frequently chosen: (1) walking, (2) gardening, (3) bowling, (4) dancing (5) swimming, (6) work around the house, and (7) camping. The percentage range for these preferences was from 72 percent for walking to 19 percent for camping.

The top ten activities actually participated in were: (1) walking, (2) working around the house, (3) gardening, (4) own exercises, (5) dancing, (6) riding, (7) bowling, (8) camping, (9) billiards, and (10) swimming. The top four activities were engaged in by over half the sample. There was a decline, from middle age, in 32 activities and an increase in 3 activities in participation figures. The increased participation was found in snowmobiling, floor shuffleboard, and personal exercises. Strenuous activities such as baseball, soccer, tennis hockey, and skiing were completely eliminated as activities engaged in by senior citizens.

The relationships between senior physical activity level and age was not statistically significant. Likewise the relationships between senior physical activity level and sex, concept of health importance, primary activity location, concept of ideal activity time per week, self assessed youth and middle age activity levels, senior activity satisfaction, youth activity variety level, and the physical nature of primary occupation type were not significant.

Significant, at the .05 level, were the relationships between the following factors: youth activity variety and sex, middle age activity variety and sex, youth activity variety and middle age variety, middle age activity variety and senior activity variety, senior activity participation level and self assessed senior activity level, middle age variety level, and senior activity variety level.

Conclusions

The sample selected for this investigation consisted only of senior citizens who were members of senior citizens' centers. Thus the findings and results are, in a strict sense, only generalizable to the population of the members of the selected senior citizens centers in Edmonton. It was determined, however, that many of the sample were not at all active in the centers and had not been for some time. It may be that the information from this study is more applicable to the general senior citizen population than was at first apparent. Further research could determine the representativeness of this sample to the overall population of senior citizens. If it was found that senior citizen center members are representative of the general senior citizen population the results of this study could be generalized further to include a larger population.

Based on the percentages of people involved in the various physical activities it appeared that overall physical activity participation decreases from youth to the senior years. While the decline was not apparent within the age classifications of the sample it was quite pronounced over the long term from pre-thirty years on. Women, in youth and middle age, did not take part in as wide a range of activities as men but during the senior years there was not a significant difference.

Of the factors tested in relation to senior physical activity level the past variety of physical activity experiences seemed to be most related to senior activity patterns. This was especially true for middle age physical activity variety levels.

It appeared that while most of the sample was quite active during youth, those who remained active in a wide variety of activity during

middle age were the ones who were more likely to be most active in a variety of activities during senior years. Those who led a relatively sedentary middle age were less likely to be active after sixty years of age.

It seemed that this generation of senior citizens still spend much of their time in productive sorts of physical activity such as gardening and working around the house. Sports and games still occupied a somewhat lower priority level for most of the sample. This is a characteristic that may change as more people reach their senior years with a wider background in recreational activities such as golf, bowling, skiing, curling, racquetball, and other previously near-unaccessible activities emerge.

This generation of senior citizens is independent and does not seem strongly in favor of regular "programming" of activities. They seemed to prefer informal sessions and programs which they can "drop into" or "drop out of" at their own wish. Any physical activity program for this age group will, to be successful, probably have to reflect this individuality of needs and desires.

General Recommendations

Within the limitations of this study the following recommendations seemed to be supported.

Extensive opportunity for physical activity participation in a wide variety of activities should be afforded the young and especially the middle aged population. Opportunities for middle aged men and women to take part in physical activity should be increased so that each individual of this age group is encouraged to maintain a high level of physical activity. This may lead to a more active senior citizen

population.

Middle age activity patterns should include activities that can be continued into the senior years. This does not exclude strenuous activities because it may be, and is in some cases, that senior citizens are actually capable of activities which are more strenuous than those now widely engaged in. For example cross country skiing, trail hiking, and racquetball may be well within the capabilities of many senior citizens and will probably become more popular with the aged in the future.

Both women and men should participate in a wide range of physical activities during middle age. Women should not confine themselves to domestic centered activity.

In the future, senior citizen centers could provide for physical activity participation through center-located facilities. One of the primary elements of recreation is physical activity and the recreation programs in the centers are enhanced with the addition of various physical activity opportunities. Maximal participation would probably be attained if the facilities for activity were located in the centers.

Physical activity programs must be sensitive to the past experiences of senior citizens. As the upcoming generations become senior citizens the past activity experiences will also vary with the result that senior citizens will be looking for different opportunities than now exist. Programs will maximize participation by expanding and modifying present opportunities in response to changing physical activity needs of the aged.

Physical activity programs should include both scheduled, formal opportunities and individualized, informal means of providing physical

activity. Formal classes, leagues, teams, and sessions should emphasize the social element as well as the physical objectives. These types of activities (yoga sessions, exercise classes, bowling, swimming) are usually group oriented and regularly scheduled.

Other activities will be better accepted if presented informally and on an individual basis. Such activities may include cycling, jogging, personal exercises and so forth. People who do not wish to become part of an organized group may still desire guidance and the opportunity to be physically active.

Apartment dwelling senior citizens should be provided with a chance to take part in physical activities in the vicinity of the apartment. Exercise classes, apartment bowling or floor shuffleboard leagues and gardening clubs can provide opportunities for senior citizens in apartments to take part in physical activity. Perhaps the senior citizen centers could provide an area of land for gardening purposes since many apartment dwellers have no opportunity for gardening activity.

Perhaps, in the future, physical education consultants could be made available to advise interested senior citizens on individual activity needs and programs. This, of course, would have to be closely coordinated with medical information provided by trained personnel.

Recommendations for Further Study

It is recommended that further study in the area of physical activity and senior citizens be carried out with a more continuous and all inclusive method of measuring physical activity extent than was employed in this study. Perhaps a method of recording intensity of activity should be used.

Further investigation into this topic would be of maximal value if

a wider population, perhaps a sample from all senior citizens in Edmonton or in Canada, were to be studied. The results would be more generalizable and more applicable to a larger population.

It may be useful to compare only those who are most active to those who are less than average in terms of physical activity. Comparisons could be made on the basis of past and present influencing factors. If the objective is to eventually maximize the physical activity level of senior citizens it may be logical to use the most active group as a model from which to develop programs during earlier years.

A study of availability of programs and facilities for senior citizens could be done to determine what exactly is available for most older people with regards to physical activity participation. Special problems such as income and transportation should also be considered regarding practical aspects of program and facility availability.

A longitudinal investigation would greatly increase the knowledge regarding total life physical activity patterns which may influence senior activity levels and habits. Perhaps these types of research could lead to well-constructed and readily available programs and opportunities designed to slow the physical activity decline that occurs from youth to old age.

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APPENDIX

Introductory Letter, Questionnaire, Answer Code Sheet,

Follow-up Thank-you Letter

FACULTY OF PHYSICAL EDUCATION
THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA T6G 2H9

DEPARTMENT OF PHYSICAL EDUCATION

February 14, 1974

Dear

My name is Brian Nielsen. I am a graduate student in the field of Physical Education at the University of Alberta.

I am presently studying the physical activity habits of people over sixty years of age. As you can well imagine, the only way to accurately study this topic is to obtain information from the people who are now sixty or over. To do this, I am working through the Lions Club Senior Citizen Recreation Centre, Strathcona Place, and the Society for Retired and Semi-Retired. These centres recognize the value of the study and approval has been obtained from their administrations.

Your name has been chosen strictly by random chance to participate in the study. The extent of your participation would be minimal: it would involve completing a one-half hour questionnaire. There will be someone present while you answer the questions and he or she will help clear up any difficulties in understanding the questions. They will also return the completed questionnaire to myself.

The questions simply deal with your opinions, attitudes and habits regarding physical activity past and present. The information is equally valuable whether you are very active or quite inactive.

This study can be an important step in helping others grow older effectively and in assisting administrations to offer meaningful activity programs to adults of all ages.

You will be contacted by telephone in the near future to set up a time and place of <u>your</u> convenience when you are able to complete the questionnaire.

Obviously, the option not to take part is yours as well, but please consider that it will not take long and that it is very valuable information which only you can give.

Thank you very much.

A. B. Nielsen

A. Brian Nielsen
(phone 484-0490)

Senior Citizen
Physical Activity Survey

Faculty of Physical Education
University of Alberta

Please answer all questions. Some require only a checkmark next to the statement which best suits your response. Others require a few words to describe your answer. Read all of the alternative responses before selecting your answer. Feel free to ask the assistant for help if you have any difficulties in understanding any part of this questionnaire.

Thank you for your participation.

A. Brian Nielsen

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The first part of this questionnaire asks some questions about yourself. All information is confidential and your name is not required.

1. What is your sex?

_____a) Male

_____b) Female

2. What is your present marital status?

_____a) Married with husband/wife living

_____b) Widow

_____c) Widower

_____d) Never did marry

3. Please list the primary occupation(s) that you have been employed in up to this time. Do not give actual company names.

	Number of years
Longest job _____	_____
Second longest job _____	_____
Third longest job _____	_____

4. What is your age?

_____a) Between 60 and 64

_____b) Between 65 and 69

_____c) Between 70 and 74

_____d) 75 or older

The following part of the questionnaire is to find out how physically active you were before you became 60 years old. Please try to answer the questions as accurately as possible.

5. Before you were about 30 years old did you belong to any sports teams clubs, associations or leagues?

_____a) Yes

_____b) No

_____c) Comments _____

If so, please list the type of club below. Do not list the full name. For example; curling, or softball.

_____ _____

_____ _____

_____ _____

6. Which of the following responses best describes your physical activity level before you were 30, compared to most people at that time?

_____a) Quite inactive

_____b) Slightly active

_____c) More active than average

_____d) About average

_____e) Extremely active

7. After age 30 did your physical activity level change?

_____a) Yes

_____b) No

8. Between ages 30 and 60 did you belong to any sports clubs, teams, associations, or leagues?

_____a) Yes

_____b) No

_____c) Comments _____

If the answer is yes please list the type of club or association below. For example; dancing club, or curling league.

_____ _____

_____ _____

_____ _____

9. Which of the following responses best describes your physical activity level from age 30 to age 60, compared to most people at that time?

_____a) Quite inactive

_____b) Slightly active

_____c) About Average

_____d) More active than average

_____e) Extremely active

10. Between ages 30 and 60 where did you get most of your physical activity and exercise?

_____a) At the job

_____b) At sporting events. (Baseball, bowling, etc.)

_____c) At recreational events. (Fishing, hunting, etc.)

_____d) In and around the house. (Gardening, etc.)

The next part of the questionnaire is to find out what your personal feelings are towards physical activity for you as an individual. There are no right or wrong answers so please feel free to state your own opinion.

11. How important do you feel that physical activity, (walking, sports, exercise) is to your health?

_____a) Very Important

_____b) Of some importance

_____c) Not very important

_____d) Other _____

12. If you answered a) or b) for question number 11, how much time per week do you think you should spend doing physical activities?

_____a) 1-3 hours per week

_____b) 4-7 hours per week

_____c) 8-10 hours per week

_____d) 11 or more hours per week

13. What are your main reasons for taking part in physical activity? Please check only four, (4) reasons.

_____a) It is just a welcome change

_____b) Just for fun

_____c) It relieves tensions

_____d) For the excitement of the activity

_____e) To learn new skills

_____f) It helps to pass the time

_____g) To get exercise

_____h) Concern for my health

_____i) Being with friends

_____J) Pleasure of feeling good

_____K) Because it is necessary

_____l) Others _____

14. What are the two, (2) main reasons that stop you from getting more physical activity and exercise? Check only 2 please.

_____a) Poor health

_____b) Don't have enough time

_____c) I am too old

_____d) My interests have changed

_____e) Transportation problems

_____f) I don't want to

_____g) I cannot afford it

_____h) The activities I desire are not available

_____i) Others _____

15. Where does most of your physical activity take place?

_____a) Everyday activities, shopping, visiting, etc.

_____b) In and around my home

_____c) At the centers, Lions Club, Strathcona Place, or Society for Retired

_____d) Other _____

16. When does most of your physical activity take place?

_____a) On my own time

_____b) during scheduled programs and events

_____c) Other_____

17. Does most of your physical activity take place when you are alone or in a group?

_____a) Alone

_____b) In a group

The last part of this questionnaire asks you some questions about what types of physical activities you would like to try if you had a chance.

18. Where do you think is the best place to do physical activities?

_____a) At my home

_____b) At an activity center

_____c) No preference

19. Do you prefer physical activity in an organized program or on your own time and at your own place?

_____a) Organized program at a senior citizen center

_____b) On my own time at my own place

_____c) No preference

20. Which of the following statements best describes how you feel about the amount of physical activity you now get?

_____a) I get enough activity

_____b) I do not get enough activity

_____c) I get too much activity

21. Which of the following responses best describes your physical activity level during the last year compared to most people?

_____a) Quite inactive

_____b) Slightly active

_____c) About average

_____d) More active than average

_____e) Extremely active

22. What are the five physical activities you would like to participate in most? You may refer to the following checklist if you wish.

1. _____
2. _____
3. _____
4. _____
5. _____

Please proceed down the following list of physical activities and check in the column which states the frequency of your participation in that activity.

Also place a check in column 7 if you were active in any of the activities listed before you were 30. Place a check in column 8 if you were active in any of the activities listed from age 30 to 60. Take your time and please try to be as accurate as possible.

ACTIVITY EXERCISE / FREQUENCY	No times in the Last Year 1	Once or Twice in the Last Year 2	About Once a Month During the Season 3	Two or Three times a month during the season 4	About once a week during the season 5	Two or More times a Week during the Season 6	Active in, before 30 years of age 7	Active in from 30-60 years of age 8
Walking for Exercise								
Table Tennis (Ping Pong)								
Jogging								
Hiking								
Billiards (Pool)								
Archery								
Skiing								
Cross-Country Skiing								
Swimming								
Fitness Classes								
Your Own Exercise								
Curling								
Golf								
Golf Driving								
Fishing								
Dancing								
Camping								
Floor Shuffle-Board								
Volleyball								
Tennis								

FREQUENCY	No times in the last year 1	Once or twice in the last year 2	About once a month during the season 3	Two or three times a month during the Season 4	About Once a week dring the Season 5	Two or More times a week during the Season 6	Active in, before 30 y of age 7	Active in f 30-60 years age 8
Badminton								
Ski-dooing								
Skating								
Bowling								
Quoits (Deck-Tennis)								
Bicycling								
Horseshoes								
Lawn Bowling								
Hunting								
Gardening								
Working around the House								
Baseball								
Football								
Hockey								
Soccer								
Others								

Senior Citizen
Physical Activity
Survey Answer Code Sheet.

1. a) b)
2. a) b) c) d)
3. _____ _____
   _____ _____
   _____ _____
   a) b) c)
4. a) b) c) d)
5. a) b)
5a. 1) 2) 3) 4) 5) 6)

   _____ _____
   _____ _____
   _____ _____
6. a) b) c) d) e)
7. a) b)
7a. a) b) c) d)
8. a) b)
8a. 1) 2) 3) 4) 5) 6)

   _____ _____
   _____ _____
   _____ _____
9. a) b) c) d) e)
10. a) b) c) d)
11. a) b) c) d)
12. a) b) c) d)
13. a) b) c) d) e) f) g) h) i) j) k) l)_____
14. a) b) c) d) e) f) g) h) i)_____
15. a) b) c) d)
16. a) b) c)
17. a) b)
18. a) b) c)
19. a) b) c)
20. a) b) c)
21. a) b) c) d) e)
22. _____
    _____
    _____
    _____
    _____

	Variety Index	Activity Level or Index (Present).
Pre-30	_____ H) L)	-) 0) +)
30-60	_____ H) L)	-) 0) +)
Present	_____ H) L)	_____ -) 0) +)

Occupation -) 0) +) Satisfaction Variable yes) no).
Concept of importance to health VI) SI) NI).

FACULTY OF PHYSICAL EDUCATION
THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA T6G 2H9

DEPARTMENT OF PHYSICAL EDUCATION

February 25, 1974

Dear

I am sending this letter to thank you for your participation and co-operation regarding the physical activity study which was carried out during January and February. I enjoyed talking to you very much and certainly learned from the experience.

Hopefully I can make the valuable information that you gave me useful to others. It is the unselfish attitudes of people such as yourself that allow much valuable and practical research to be completed and applied.

I would like to add special thanks to those who saw me twice, once for the original interview and once for a retest. Your extra effort adds reliability to the study.

Again thank you very much for your time, interest, and above all your important contribution of information. I was very pleased to meet you and will remember the unselfish effort on your part which contributed to the study.

Sincerely,

A. B. Nielsen

A. Brian Nielsen